DOCUMENT RESUME

ED 057 264 AA 000 757

AUTHOR	Harmon, Catherine; Harmon, George
TITLE	Microfilm in the Classroom: The Barrington School Project.
INSTITUTION	National Microfilm Association, Silver Spring, Md.
REPORT NO	NMA-TM-500
PUB DATE	71
NOTE	56p.
AVAILABLE FROM	National Microfilm Association, Suite 1101, 8728 Colesville Road, Silver Spring, Md. 20910 (no price quoted)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Academic Achievement; *Classroom Techniques; Cooperating Teachers; Coordination; *Grade 3; Individualized Instruction; *Instructional Materials; Learning Experience; *Microfilm; Program Evaluation; *Projects; Reading Instruction; Testing; Test Results
IDENTIFIERS	*Barrington School Project

ABSTRACT

The purpose of this project was to determine whether children in a third-grade classroom could work together in a learning experience. Microfilm and microfilm readers were used as materials for the dual studying technique. Various microfilm companies copied books in different microforms, including 16mm and 35mm roll film, 16mm in containers, and microfiche. Both negative and positive images were produced. To judge the effectiveness of this approach to individualized instruction, a formal test program was devised. The tests show a dramatic educational gain for the children in the project. Evaluation of the materials indicated that they need to be made more applicable for classroom teaching. Testing methods were found to be insufficient; better ones need to be developed. It is recommended that similar studies be conducted. An appendix presents ITPA and SRA graphs for two students, as well as tabulations showing their percent gains on 12 tests. Graphs and tables are also given of class scores on visual association, composite ITPA, and total reading tests, as well as gains on SRA composite results. (CK)

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TM–500

MICROFILM IN THE CLASSROOM: THE BARRINGTON SCHOOL PROJECT

by

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FOREWORD

The attached report is a summary report of the Barrington School Project. The goals of the Project and how closely they were met are shown, as well as a series of recommendations.

Although all children were tested, and charts were prepared to measure growth, only the charts for three children are enclosed. The lowest child at the beginning of the Project, the highest graded child, and the one child with the normal level of 3.1 years have been used. Class summaries were also charted, but only the Composite Test results and Reading Results are included here.

One phase of the Project is still incomplete. It is desired to again test the children at the end of the summer to check whether growth continued or whether recession took place.

The cooperation given by all participants in the Project is appreciated. It is hoped that the recommendation for extended study will be accommodated and that most of the participants will be able to continue.

The National Microfilm Association has agreed to distribute this report. NMA is not responsible for the validity of the contents of the report.

THE BARRINGTON SCHOOL PROJECT

The report to follow is about an educational experiment carried out in Barrington, New Hampshire. Although, not the usual method of presenting a report, we would like to begin with the ending.

The Barrington School Project was a success. The children who participated have experienced a better relationship with the educational process and, if one can believe test results, are farther advanced than they would have been had it not been for the Project.

It is not known exactly what factors contributed to the successful educational experience of these third grade children in Barrington. The success may have been due to the teacher, the individualized instruction technique, the use of microfilm, the expanded resource that microfilm provided, the novelty of the Project, the excitement of the attention given, or some factor not even considered.

Since there has been apparent educational growth beyond normal expectations, there should be effort expended to determine what factors induced this growth and whether it is possible to induce such growth under controlled conditions.

BACKGROUND

While a student at Gorham State College, a division of the University of Maine, Catherine Harmon became interested in the educational technique known as individualized instruction. One specific method intrigued her. This is the situation where two children with vastly different capabilities study together. The system had been used with "exceptional" children with good results. The theory is that the advanced child becomes a teacher with the additional challenge while the slower child progresses at a faster rate because of the closer affinity for the child teacher than for the adult teacher. Thus, for both there is better education. Miss Harmon felt the procedure could easily be applied in a regular elementary classroom.

When Miss Harmon was interviewed for a job as a third grade teacher in Barrington, New Hampshire, she and the school principal, Mr. Barry Clough, discussed the use of individualized instruction in the classroom. She then talked with her father about the subject, wondering whether microfilm and microfilm readers, rather than the book or a pair of books, could be used in the classroom for the dual studying technique. It seemed to offer great possibilities, and perhaps, should be tried. Thus began what is now known as the "Barrington School Project."

BACKGROUND (Cont.)

The School District was contacted to assure cooperation. Mr. Charles Morgan, the School Superintendent, approved and also received approval from the Barrington School Board. Mr. Clough was pleased to have the Project take place in his school.

It was next necessary to obtain permission from the individual publishers to microfilm those books scheduled for use in the third grade classroom. The primary publishers all gave permission to copy that material which they controlled. Total cooperation was received from American Book Company, Science Research Associates, Scott Foresman & Co., Harcourt Brace Jovanovich,and Follett Educational Corporation. The individual copyright owners were then contacted. All publishers and authors with one exception gave permission to microfilm for the Project.

Microfilming then began. Microfilming Corporation of America, Graphic Microfilm of New England and Arcata Microfilm copied the books in various microforms. Eastman Kodak produced color microfiche copies of the science book. National Cash Register produced ultrafiche copies and the Keuffel and Esser Company made some special reduction microfilm copies.

BACKGROUND (Cont.)

The wide variety of microforms included 16mm and 35mm roll film, 16mm in containers,and microfiche. Both negative and positive images were produced and various sizes of imagery. It was intended to check which type of microform was most appropriate for use in an elementary classroom.

Many in the microfilm industry, upon learning of the Project, offered readers, projectors and reader printers. Other equipment,such as duplicators, was offered but had to be refused for this first year of the study. Readers were received from Realist, Micro-Scan, Eastman Kodak, Arcata, University Microfilms-Xerox, Bell & Howell, Ednalite, Reproduction Systems, Viewonics, Dasa, Taylor-Merchant, Dioptrix, Information Handling Services, Washington Scientific, National Cash Register, Dietzgen, Stromberg Datagraphix and Micro Design. A reader-printer was loaned for a short period of time by SEMCO Business Products.

It was learned that a variety of other programs were being conducted. A few of these programs had generated materials for the elementary grades although most programs had been directed toward high school, junior college, and college situations. Materials on microfilm from these Projects were contributed to the Barrington School. A large number of

BACKGROUND (Cont.)

books on film were provided by University Microfilms-Xerox and by Arcata Microfilm. Other materials were provided by Bell & Howell, Instant Information, Arbutus Publishing, Dasa, and Information Handling Services.

To judge the effectiveness of this new approach to education in the elementary school, a formal test program was devised. The use of the other third grade class at the Barrington School was not considered to be a suitable control group. It was believed that a drastic difference within the school would impose an adverse learning pattern on those students deprived of equipment and special attention. Therefore, a special program was instituted for the other third graders, and the national averages were considered the base to compare relative educational growth. Some comparisons were also to be made between the two classes.

Nancy Fletcher, the other third grade teacher brought to her class several years of teaching experience as well as background as a librarian. In the judgement of most, including the principal and other teachers, Mrs. Fletcher is an outstanding educator. (She will not be returning to the school because of winning a much sought Ford Fellowship.) The program instituted by Mrs. Fletcher involved using two

BACKGROUND (Cont.)

readers in her classroom as a library supplement and additional educational resource. The units were placed in the rear of the room and were available for special assignments and for children who had completed their regular assignments.

The parents were kept informed about the new program. A well attended PTA meeting acquainted them with the Project. Notes to the parents advised them of the progress being made.

Visitations to the school were limited. Two effects were feared. Too many visitors would interfere with the educational process. Special visitations could create excitement which might show good results, but as a "Hawthorne Effect" rather than because of the new procedures. (The "Hawthorne Effect" refers to improved output as a result of attention being focused on the subject rather than as a result of the change in conditions.) A visitation day was held March 16th when most contributors and other participants in the program were able to attend a seminar and see the school. Some parents took this opportunity to participate in the discussion of the Project.

TEST CONDITIONS

Two types of tests were conducted simultaneously. The facilities were analyzed for appropriateness in the particular teaching situation. All of the various control factors were judged against expected perfect performance with notes made of any inadequacies. At the same time that the equipment and materials were being checked, the students were being tested for growth in understanding.

The materials used in the Project were evaluated as to usability for teachers and students, and acceptability by students, with emphasis placed on determining deficiencies. Each form including roll, cassette, cartridge, microfiche and ultrafiche was judged as to its adaptability in a third grade classroom. The image form, size, color and location were judged for desirability for students. Reactions of the teacher, the students, other teachers, parents, and others associated with the Project were assessed.

The equipment used in the Project was analyzed for effectiveness. Characteristics evaluated include image intensity, screen and image size, magnification, rotation of image, scanning capability, reception of color images, angle of screen, film protection, lamp life, ease of operating controls,

TEST CONDITIONS (Cont.)

ease of loading, and portability.

The special technique of individualized instruction was examined for overall effectiveness with a desire to improve the concept if possible.

The testing of the children was a complex procedure. There seems to be no universally accepted method within the educational community for measuring the educational growth of a student. The teacher is considered by many educators as the only judge of student academic gains while others rely on a variety of oral and written tests. For this Project, both systems were used.

The teacher in the specially equipped classroom evaluated each child at the beginning of the school year and then at the end of the year with an attempt to determine any visible change in the student's abilities. (It should be noted that Miss Harmon was in her first year of teaching and brought to the evaluation only her college training with no other experience in such evaluating.) Previous judgements of these children were referenced at the end of the Project to check reliability of results.

Evaluation of effects of the Project on the students in

TEST CONDITIONS (Cont.)

Mrs. Fletcher's third grade class were made by her.

Parents were randomly checked to ascertain any obvious effects of the Project. This was considered to be particularly important since children upon occasion took home school work in microform with a reader.

The formalized testing involved two specific tests, the Science Research Associates Aptitude Test for Grades 2 to 4 to be referred to as the SRA and the Illinois Test of Psycholinguistics Abilities to be referred to as the ITPA.

Both classes were tested (in October and June) with the ITPA using qualified testers. This was conducted by Mrs. Ethel Mazza, the first grade teacher at the Barrington School. For each student a chart has been made to show individual test levels with respect to expected normal level for the child's age. In addition, a gain chart was made to check growth. Each test has also been plotted to show the spread of abilities in each of the two classrooms and the average growths.

The SRA tests were given by the classroom teachers in October and June. The same tests, form C, were given to each class in October with the form D test given in June. A third SRA testing was given to the subject class in March. Two reasons for giving

TEST CONDITIONS (Cont.)

the extra test were to determine as soon as practicable whether results would be different than expected and to check whether students were guessers with invalid scores. Testing in March would allow some changes in the program if required. It also gave a break-point to check whether growth was only at the start of the program when extreme amounts of attention were being given to the students. The Hawthorne Effect was understood and all possible steps were taken to isolate this effect from the final results.

The results of the various tests were plotted for all children with appropriate gains in scores. The charting of each individual test was also done. The main purpose in charting was to provide the best possible gauge of educational growth of the students in Miss Harmon's class with respect to national averages, to the other third grade class and to each child's previous growth pattern. Percentage-of-gain charts were formulated and then a measurement graph was constructed to show the students' comparative growth versus beginning aptitude level. Since the SRA tests in this case were given at 3.1 years and 3.9 years the expected gains would be either 0.8 years or 38.1%.

TEST CONDITIONS (Cont.)

The results were then computed in the formula (A+2B+2C+D)-(2E+3F) where:

A = Number of students with more than expected percentage gain (38.1%) and more than expected years gain (0.8 years), but less than 1 1/2 times expected years gain (1.2 years).

B = Number of students with more than expected percentage gain (38.1%) and 1 1/2 times or more expected years gain (1.2 years).

C = Number of students who exceeded limit level of test (6th grade level).

D = Number of students with expected percentage gain (38.1%) or less, but with more than expected years gain (0.8 years).

E = Number of students with expected percentage gain (38.1%) or more, but with less than expected years gain (0.8 years.)

F = Number of students with less than expected percentage gain (38.1%) and less than expected years gain (0.8 years.)

NOTE: Students with exactly the expected years gain (0.8 years) are not included.

TEST RESULTS

The results from the formalized tests and general analyses cannot be called conclusive, but they certainly give indications of trends and effects related to this different approach to education.

Evaluation of the materials used in the Project disclosed many inadequacies. This could have been expected since most materials were generated for other purposes. However, as indicated by overall attainments, the available materials were sufficiently applicable in the Project.

Prior to describing the suitability of the microforms, it is best to discuss the content. Specific comments will not be made in this report since actual findings are reported only to the contributor. However, generalized comments can be made.

The text books which were used in their bound form as the primary teaching medium were not totally acceptable in the microform. Creating a variety of lesson plans, some for teacher guided groups and others for unassisted student groups, became a time consuming effort. The text books, although provided with teacher's guides, were set up for large groups led by the teacher and did not lend themselves well to individual

TEST RESULTS (Cont.)

rates of learning. In an individualized program, it is advisable to have some sort of programmed instruction in which the children can progress from one lesson to the next without teacher guidance. No such material was yet available. Some of the materials might also have been used effectively if they were produced in color. The textbooks are filled with illustrations and some lessons lose impact when color is removed. The science book had the only color microfilm. All texts were usable including Mathematics, Language Arts, Social Studies, and Reading.

A second group of materials was the large number of reading books provided in microform. These were used extensively by the students. Some students read from them at every opportunity. Several children read more than 25 books in this form. All students also increased their reading of hard copy and paper-back books. The demand for purchase of books through the school program was the highest ever for such a class. The greatest problem was the lack of proper level books. The children entering the Project were primarily below third grade level. A limited number of books for these children was available. In order to satisfy the desires of the students in this area of reading permission was given to take home both readers and microfilm for home-study.

TEST RESULTS (Cont.)

Other materials include microfilm of a local newspaper, special materials for the dyslexiac or extremely slow student, and teacher guides including specialty resource material. The teacher found all of this material helpful, but did not consider that she had utilized it very efficiently. Another resource she was able to use was the file of film strips in the school. Small group use of them with the microfilm readers seemed a most beneficial teaching tool.

A finding of this study which does not relate to the use of microfilm, but which should and could be corrected if mass use of this form were considered, is the difficulty young children have with hyphenated words. Since the microfilm was only a copy of existing books, the problem is one introduced by the original publishers. This comment should not be construed to indicate all publishers utilize hyphenation. Some indicated strong opposition to its use because it limits dramatically the vocabulary growth particularly with young children.

Results were inconclusive on many of the characteristics of the microfilm being evaluated in the Project. The children were very careful not to touch the image areas on the microfilm. However, the amount of use was abnormally high and the

TEST RESULTS (Cont.)

image areas were scratched and worn. The microseal microfiche enclosures solved the problem.

Comparing the various formats only showed that there is a place for each type. Roll film is easily handled and has consecutive images, but when dropped by a young child, it will roll across the classroom floor. This damages the film and creates unwanted commotion. Cartridges had the advantages of roll film without the disadvantage of rolling when dropped. However, excessive use, as in an elementary classroom, causes breakdown in the mechanical handling of this microform. Microfiche seemed to have no mechanical problems, although the fact that pages are not consecutive created some problems. Multiple sheets are required for most text books. Ultrafiche contained perhaps too much information per piece. With only one unit this could limit student use. One characteristic of all these microforms was the inability to duplicate the function of a bookmark. It was often necessary to relocate images from the previous day's work and it was difficult, especially for students just beginning to read. The concept embodied in the cassette of Information Handling Services solves that problem.

TEST RESULTS (Cont.)

Attempts were made to rate positive images versus negative images. The negative image has black background with light characters. Above-average students and those who read large amounts preferred the negative microfilm. The slower students preferred the positive microfilm. Some children wanted negative, because of the "funny" pictures which were reversed. No combination film was obtained which contained positive image pictures with negative image text. The situation of photographs and written passages on the same film required positive film usually.

The size of image was rather important to the slower child with a preference for a large image with enlarged characters. A single image on the screen seemed to be preferable to two pages as in book reading. The readers displaying portions of adjoining pages were particularly distracting. Color film was preferred for illustrations of any kind. Indications are that the younger and slower children learn better with color.

The specific comments and analyses of the equipment are submitted to the individual manufacturers who provided products. Although nearly a full school year was used to evaluate readers, there was not sufficient time to analyze all functions completely. Both rear projection and front projection units

TEST RESULTS (Cont.)

have applications in the classroom. Neither was overwhelmingly preferred. The angle of the screen is important. A child's concentration level is affected by the angle as well as by the height of the machine and the image. Image intensity affects reading ability, but insufficient time was given to determining the best value. Ease of loading and operation are minor considerations. Children are very adaptable. Each child developed preferences, but the pattern was inconsistent. All liked the ability to move a unit around the room, under desks and even home. Readers withstood the constant use remarkably well. No bulb burned out during the entire year.

The Reader-Printer could be a great asset to the teacher, but not as an active educational tool. It did not seem to have as great an adaptability to classroom teaching. Furthermore, the children became afraid of getting shocks when sparks were seen.

The technique of individualized instruction used at Barrington seemed to be effective. The teacher attempted to utilize a top student with a slow student. This could not totally work. A slow boy would not work with the advanced girls and there was a lack of advanced boys in this particular class. The teacher also found that some advanced students could not act as teachers at all.

TEST RESULTS (Cont.)

There were several other interesting findings. When one tries to assign top student with bottom, then second top with second bottom, etc., one finally arrives in the middle with children of similar capabilities. It was noted that when several boys of the approximate same level worked together they became very competive with all of them advancing rapidly. The children gradually drifted into established partnerships. One unique pair began as a high and a low, teacher and student. The student progressed very fast and the two changed roles. The growth of the original slower student was measured as one of the greatest in the class.

The students really enjoyed working as groups of two or three with the microfilm reader. The teacher found that with most students occupied in self-teaching, she could work with special problems.

Results of the Project as measured by the educational growth of the students indicated that the Project was successful. Miss Harmon in her analysis of each child noted the growth through the year which seemed to her to be better than what might be expected. As a first year teacher, she could not make comparison with other classes. (The Appendix includes her evaluations of the individual students.)

TEST RESULTS (Cont.)

Mrs. Fletcher began the program believing that children should not use microfilm. Her library background gave her a love for the book. She feared use of microfilm would destroy interest in books and therefore hurt the children. As the program progressed, she noticed that those few students using the readers were also taking more books from the classroom library. She then became actively rather than passively cooperative and aided in expanded use in her classroom. The routine that some of Mrs. Fletcher's students developed amazed her. Some of the slower students convinced one of the advanced boys to help them read at the microfilm reader. There seemed to be a minimum of interclass reaction even though there were brothers and sisters in the different third grades.
Mrs. Fletcher believes that there is a real future in the use of microfilm.

Other teachers in the school at first tolerated the Project. However, after watching early effects desired to try the equipment in their classrooms. Several minor programs were carried out using materials and equipment donated to the school. The entire Barrington School would like to have microfilm and equipment. The School Board placed an item in the budget to help provide this need.

TEST RESULTS (Cont.)

Barry Clough, the principal, has been pleased to be a part of the Barrington School Project. He believes that as an added educational resource microfilm can really help the rural school.

Parents of Miss Harmon's students were excited about the new educational technique and expressed the opinion that it was responsible for dramatic changes in the attitude of their children toward school and books.

The formalized tests show a dramatic educational gain for the children in Miss Harmon's class. The Appendix includes the test results for both the ITPA and SRA and for the children in both classrooms.

The following charts show individual and collective class results:

1. Students in both classes ITPA series of tests taken in October and June with a gain chart to indicate change.
2. Students in Mrs. Fletcher's class SRA series of tests taken in October and June with a gain charts to indicate change.
3. Students in Miss Harmon's class SRA series of tests taken in October, March and June.

TEST RESULTS (Cont.)

4. Students in Miss Harmon's class SRA series of tests with changes between October and March, between March and June, and between October and June.

5. ITPA individual tests with student distributions in each class in October and June with a gain chart to indicate growth. The individual tests are:

    1. Auditory Reception
    2. Visual Reception
    3. Auditory Association
    4. Visual Association
    5. Verbal Expression
    6. Manual Expression
    7. Grammatic Closure
    8. Visual Closure
    9. Auditory Sequential Memory
    10. Visual Sequential Memory
    11. Composite

6. SRA individual tests with student distributions in Mrs. Fletcher's class in October and June with a gain chart to indicate change. The individual tests are:

    1. Reading Comprehension
    2. Vocabulary
    3. Total Reading
    4. Capitalization and Punctuation

TEST RESULTS (Cont.)

6. (Continued)

    5. Grammatical Usage
    6. Spelling
    7. Total Language Arts
    8. Arithmetic Concepts
    9. Arithmetic Reasoning
    10. Computation
    11. Total Arithmetic
    12. Composite

7. SRA individual tests with student distributions in Miss Harmon's class in October, March and June.
8. SRA individual tests with student distributions for gains in Miss Harmon's class from October to March, from March to June, and from October to June.
9. Results charts of the ITPA scores showing each class and total of all students for High, Low, Mean and Median.
10. Results charts of SRA for each class and both combined of all students for High, Low, Mean, Median, Number Above Average, and Number Below Average.
11. Each student's SRA test scores with initial and final gains (October and June) with % gain.
12. Each SRA test score versus % gain for each class as a graphic representation.

TEST RESULTS (Cont.)

The testing in March proved what was surmised. Several children were guessers. All questions were checked to establish this. These children were not included in any test results. This meant elimination of two children from the statistics, both much older than class average and previously given automatic promotions. There were a total of twenty-nine students in Miss Harmon's class and twenty-eight in Mrs. Fletcher's. Moves in and out, untaken tests, and the dropping of two students left twenty-five and twenty-four respectively.

The tests used were not totally adequate. Many children exceeded the maximum scores. However, relative gains were shown. One result shown and not as yet understood, was that Miss Harmon's students made generally more gains in their weaker areas. There is also an indication that in some areas there was a greater growth from March to June than from October to March discounting the Hawthorne Effect.

Although it was not considered proper to compare the two classes because of the great difference in teachers, a comparison is made using the charts of effective gain and the following formula:

$$(A+2B+2C+D) - (2E+3F) = \text{GAIN FACTOR}$$

TEST RESULTS (Cont.)

Gain Factor values should range between -8 and +8 for an average class of twenty-five with a highly qualified experienced teacher. The range should be between -16 and 0 with an average teacher. The reliability of results is increased with cumulative scores. Therefore, more weight in analyzing should be given to the combining test scores -- Total Reading, Language Arts, Arithmetic, and Composite.

Following are the comparative results:

TEST 1 Reading Comprehension

F [(3)+2(9)+2(4)+(0)] - [2(0)+3(8)] = 29-24=5

H [(1)+2(7)+2(8)+(0)] - [2(1)+3(6)] = 31-20=11

TEST 2 Vocabulary

F [(2)+2(10)+2(2)+(2)] - [2(1)+3(7)] = 28-23=5

H [(2)+2(13)+2(2)+(1)] - [2(2)+3(4)] = 33-16=17

TEST 3 Total Reading

F [(1)+2(12)+2(2)+(0)] - [2(2)+3(7)] = 29-25=4

H [(7)+2(8)+2(4)+(1)] - [2(2)+3(3)] = 32-13=19

TEST RESULTS (Cont.)

TEST 4 Capitalization and Punctuation

F [(3)+2(10)+2(1)+(0)] - [2(3)+3(9)] = 25-29 = -4

H [(2)+2(7)+2(1)+(0)] - [2(4)+3(9)] = 18-35 = -17

TEST 5 Grammatical Usage

F [(2)+2(5)+2(5)+(0)] - [2(3)+3(7)] = 22-27 = -5

H [(3)+2(7)+2(8)+(0)] - [2(2)+3(5)] = 33-19 = 14

TEST 6 Spelling

F [(10)+2(7)+2(0)+(1)] - [2(1)+3(5)] = 25-17 = 8

H [(3)+2(11)+2(3)+(1)] - [2(4)+3(2)] = 32-14 = 18

TEST 7 Total Language Arts

F [(3)+2(10)+2(1)+(0)] - [2(2)+3(7)] = 25-25 = 0

H [(5)+2(10)+2(2)+(0)] - [2(1)+3(6)] = 29-20 = 9

TEST 8 Arithmetic Concepts

F [(3)+2(10)+2(1)+(0)] - [2(2)+3(7)] = 25-25 = 0

H [(5)+2(10)+2(2)+(0)] - [2(1)+3(6)] = 29-20 = 9

TEST 9 Arithmetic Reasoning

F [(3)+2(5)+2(0)+(0)] - [2(2)+3(14)] = 13-46 = -33

H [(4)+2(13)+2(3)+(0)]- [2(0)+3(3)] = 36-11 = 25

TEST RESULTS (Cont.)

TEST 10 Arithmetic Computation

F [(3)+2(6)+2(0)+(1)] - [2(0)+3(14)] = 16-42 = -26

H [(2)+2(3)+2(0)+(0)[- [2(0)+3(19)] = 8-57 = -49

TEST 11 Total Arithmetic

F [(4)+2(6)+2(0)+(1)] - [2(2)+3(10)] = 17-34 = -17

H [(4)+2(9)+2(0)+(0)] - [2(1)+3(7)] = 22-23 = -1

TEST 12 Composite

F [(11)+2(3)+2(0)+(1)] - [2(0)+3(5)] = 18-15 = 3

H [(5)+2(10)+2(0)+(2)] - [2(4)+3(1)] = 27-11 = 16

CONCLUSIONS

The Barrington School Project was a success. The original intention was to determine whether children in a third grade classroom could work together in a learning experience. Microfilm and microfilm readers were considered the best way to implement such a program. All answers were not obtained but the indicated educational growth of the students proved the concept was practical. Many more questions were raised. When these new questions are answered, the educational system should have a new technique which will provide more efficient, high quality education.

CONCLUSIONS (Cont.)

The evaluation of materials and equipment was incomplete, but certain conclusions were reached. No one form satisfies all conditions. Color is best for some subjects and for young and slow students. Film must be protected against excess wear. Answers are still needed for such questions as: What polarity? Rear or front projection? What magnification ratio? What angle for best reading? What brilliance on screen? It was shown that equipment today is adequate, but improvements can be made. Microfilm readers can better the utilization of film strips.

The materials on microfilm need to be made more applicable for classroom teaching. There should be programmed instruction to accompany materials. Hyphenation should be eliminated from young students' reading materials.

The technique of small group study is effective. This specialized technique seemed to increase capabilities and desires of students for reading. The teacher is more efficient by removing time consuming methods, allowing her to work on special problems.

Testing is still difficult. There are insufficient methods of measuring student growth or teacher effectiveness. The

CONCLUSIONS (Cont.)

tests used had insufficient range to totally measure the growth of many students who recorded maximum scores. The wide swing in results also indicates insufficient refinement in testing.

The results of the Barrington School Project warrant continued application and study of the specialized individualized instruction technique using microfilm.

RECOMMENDATIONS

The primary recommendation is to continue the study of this technique. It is suggested that the same procedure be repeated in the third grade at Barrington to verify results obtained this year. The children in the fourth grade this coming year, who were the subject students should also have another year to determine if the educational growth will continue at a similar rate.

It would be advisable to conduct a study in a variety of other schools. Similar rural schools and perhaps in other parts of the country might confirm that the procedure is adaptable to such groups. Other types of schools, such as inner-city, suburban, low income, high income, and private should be

RECOMMENDATIONS (Cont.)

tested. Only with more results can one assure that a new effective method of education has been discovered.

Equipment modified in design to agree with some of the suggestions should be tried. Better materials should be created and introduced.

Hyphens in children's books should be eliminated.

Special studies should be conducted to determine the characteristics of microfilm best suited for this application. Particular emphasis should be placed on a study to compare positive images, negative images, and a combined positive illustration-negative text image.

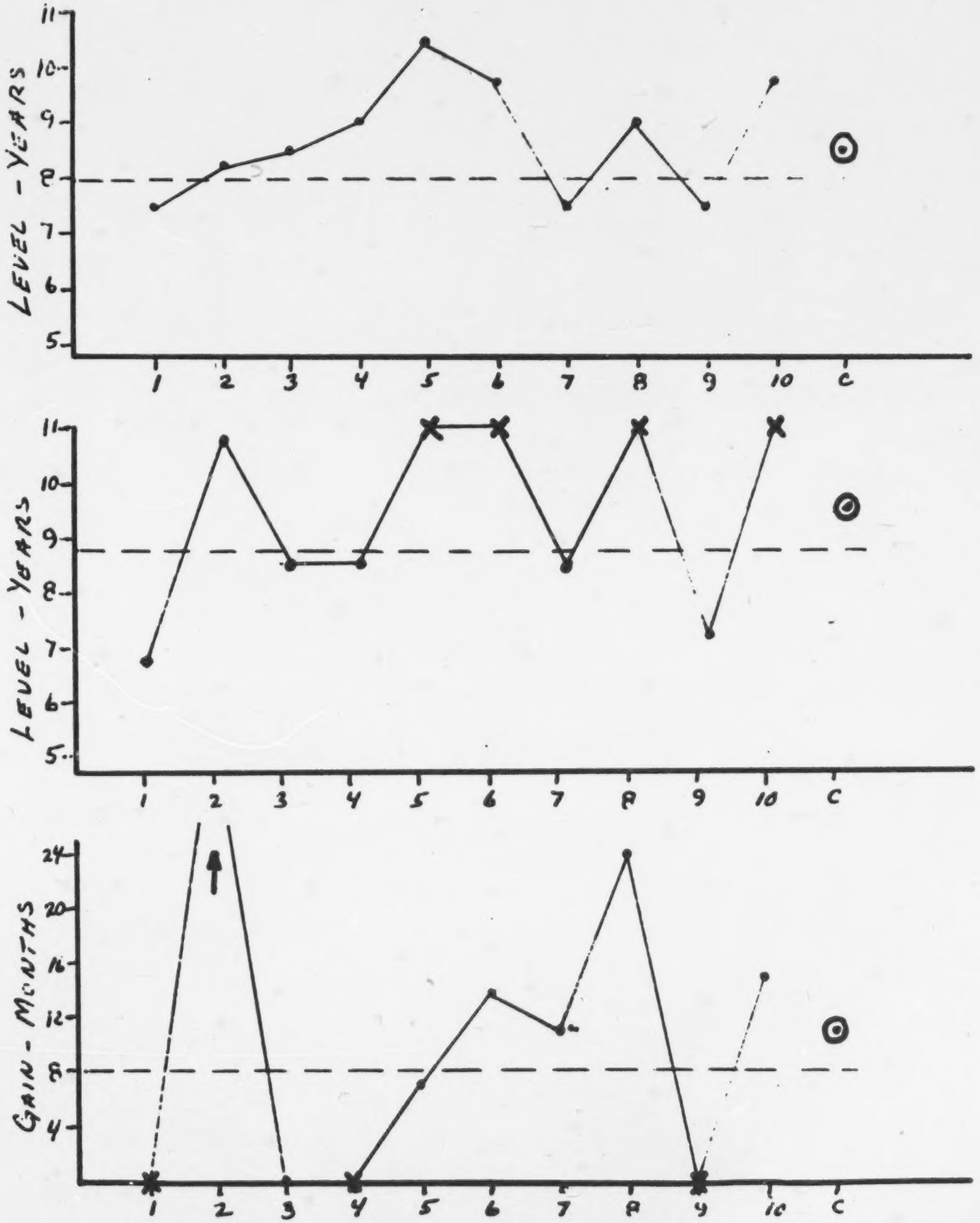
Since the Barrington School Project was a success, the methods used in the Project should be applied to any educational program where higher quality and less expensive education is desired.

APPENDIX

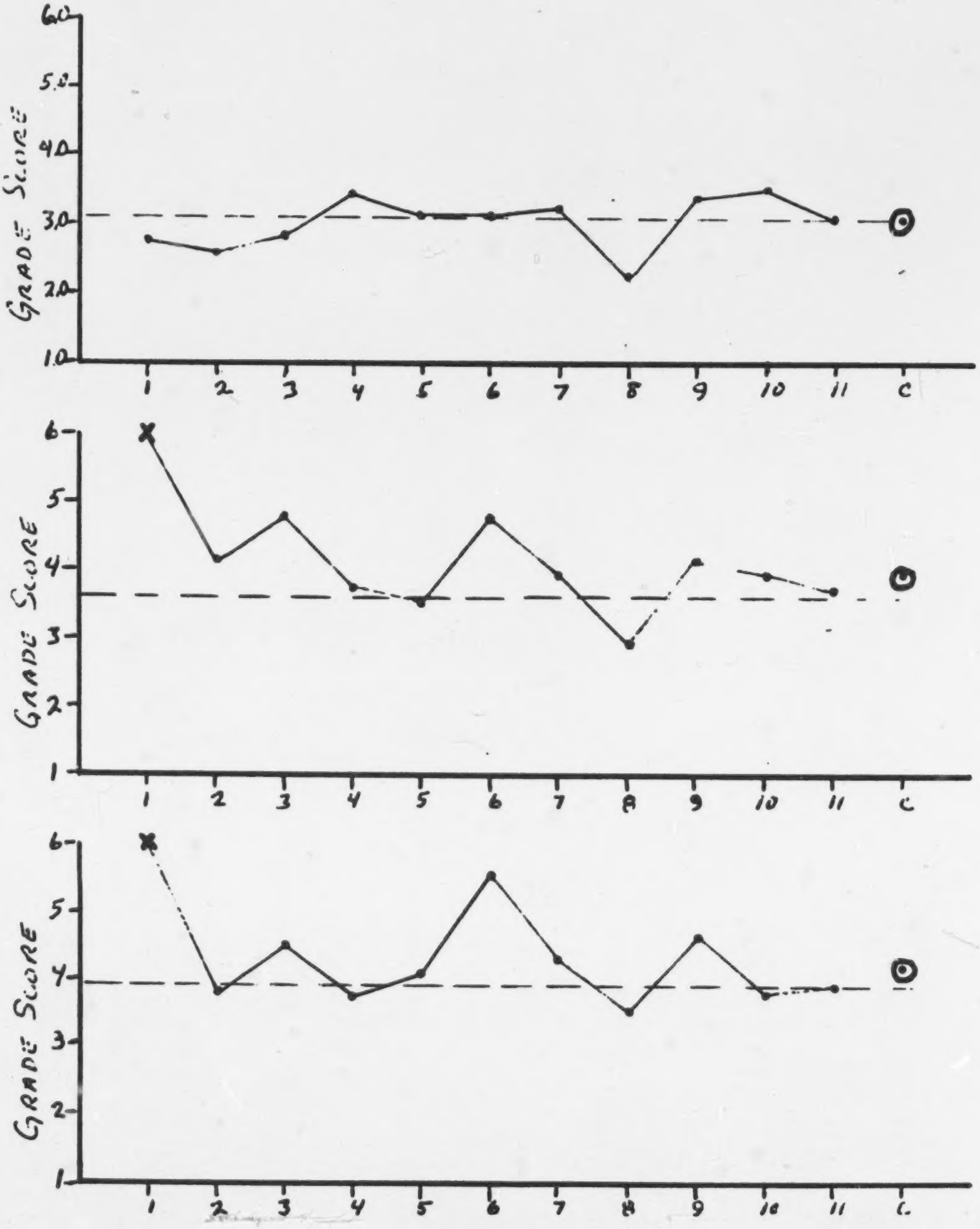
STUDENT H-5

Student H-5 entered the class as an average, willing, almost ideal third grade student. She was able to grasp new ideas with relatively few problems. She read on a beginning third grade level and progressed readily. She enjoyed school, especially reading both in books and on film. Before the year ended, she had shown her greatest growth in reading. Although still reading in a high third grade reading book, she had more fluency and comprehension than either of her reading partners. She had become a competent speller and was doing well in mathematics.

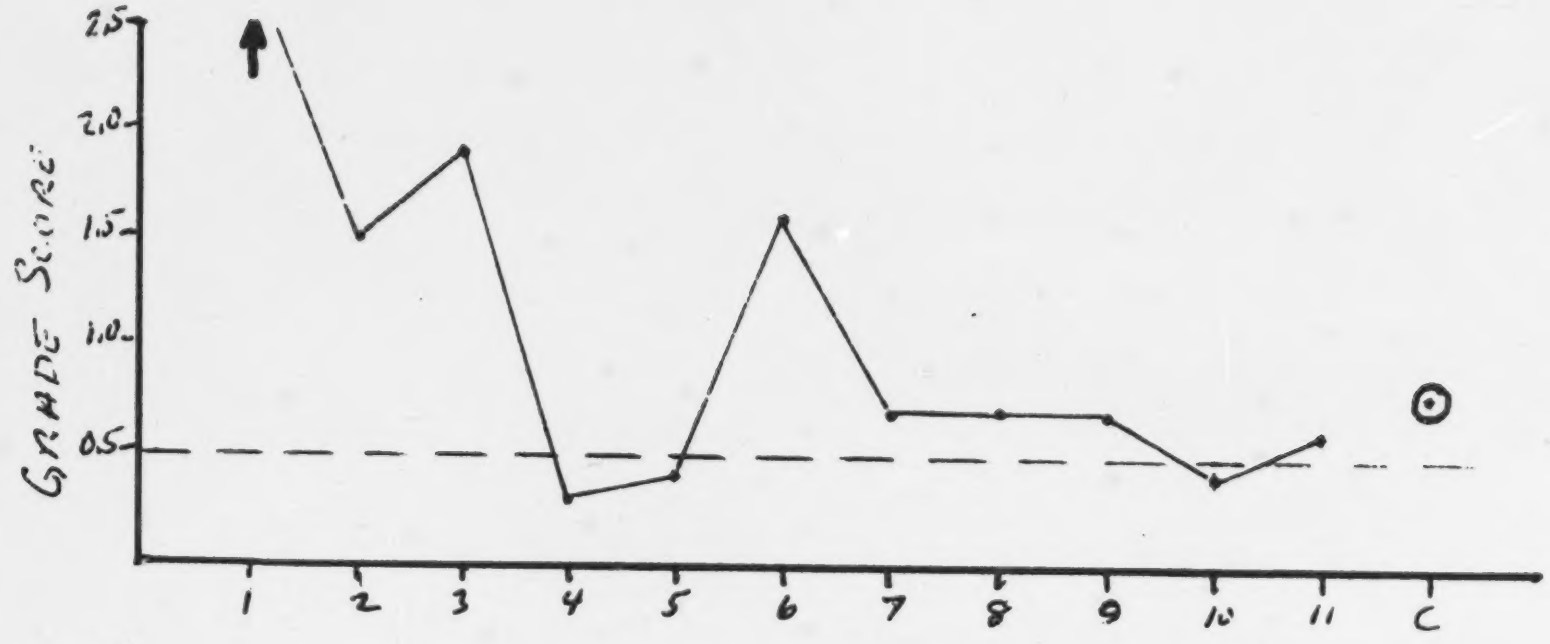
STUDENT H-5
ITPA

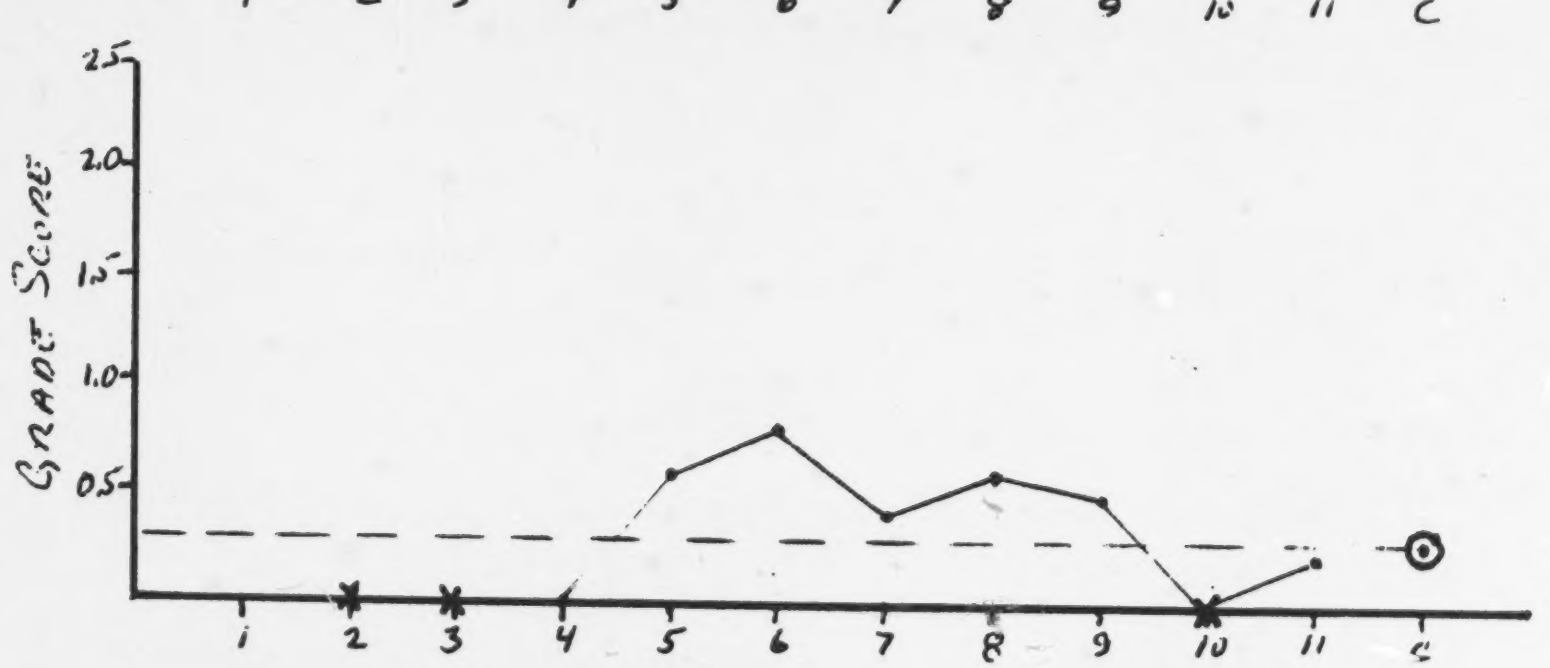


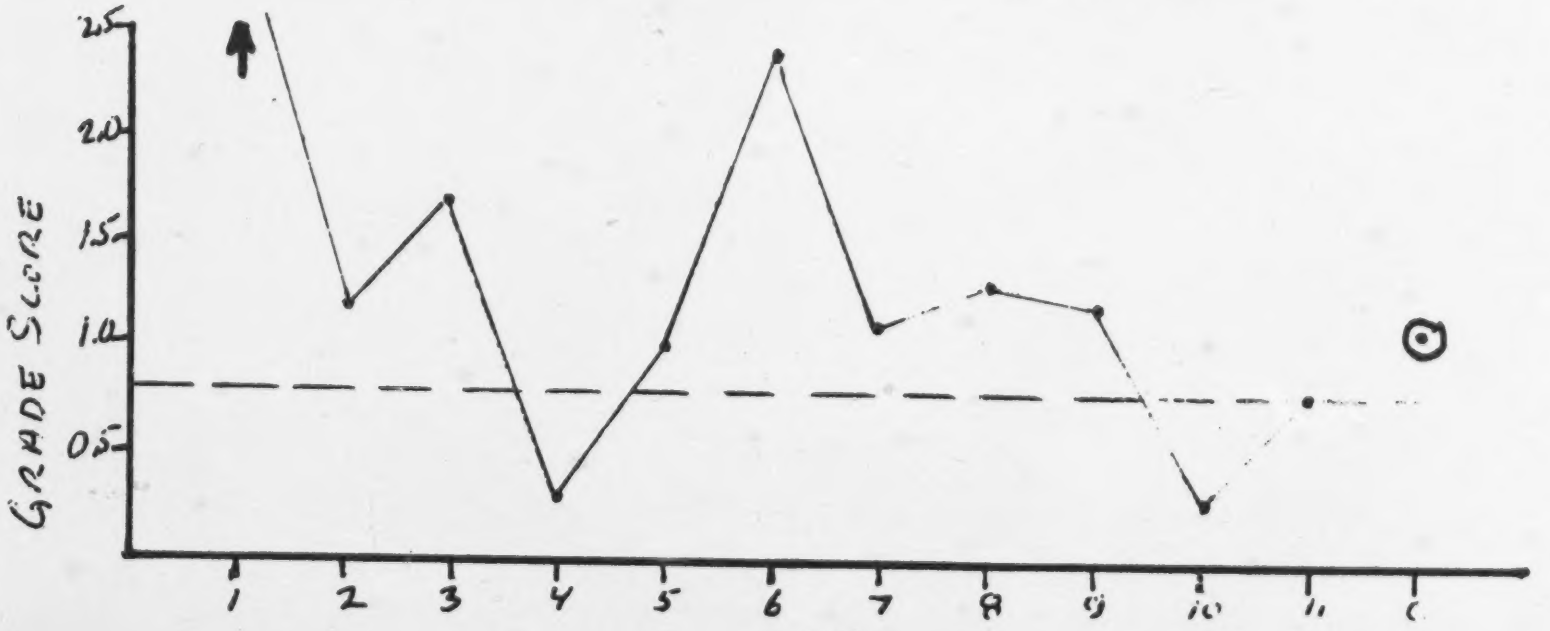
STUDENT H-5
SRA



STUDENT H-5
SRA GAINS







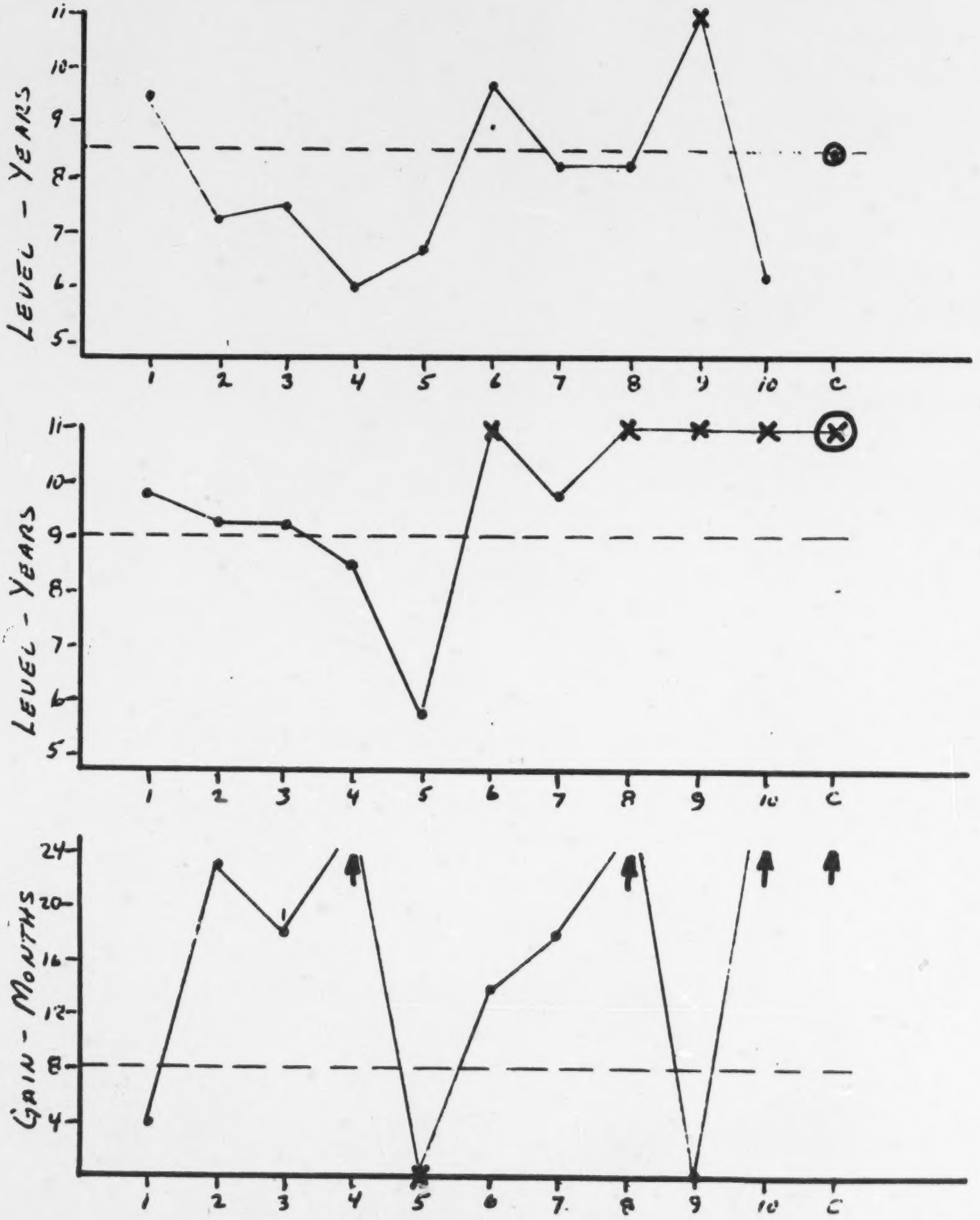
STUDENT H-5

TEST	INITIAL SCORE	GAIN	FINAL SCORE	GAIN	% GAIN
1	2.8	1.8	6+	3.2+	177.8+
2	2.6	1.6	3.8	1.2	75.0
3	2.8	1.8	4.5	1.7	94.4
4	3.4	2.4	3.7	0.3	12.5
5	3.1	2.1	4.1	1.0	47.6
6	3.1	2.1	5.5	2.4	114.3
7	3.2	2.2	4.3	1.1	50.0
8	2.2	1.2	3.5	1.3	108.3
9	3.4	2.4	4.6	1.2	50.0
10	3.5	2.5	3.8	0.3	12.0
11	3.1	2.1	3.9	0.8	38.1
C	3.1	2.1	4.2	1.1	52.4

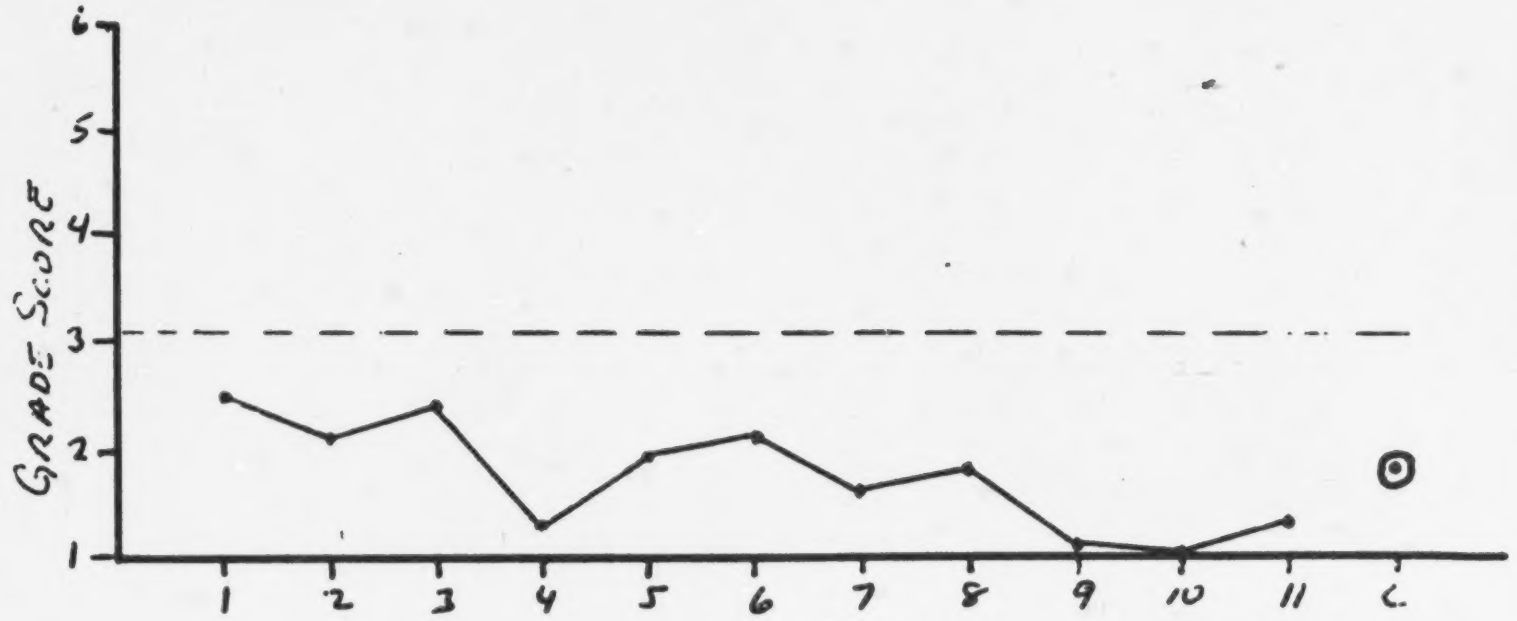
STUDENT H-18

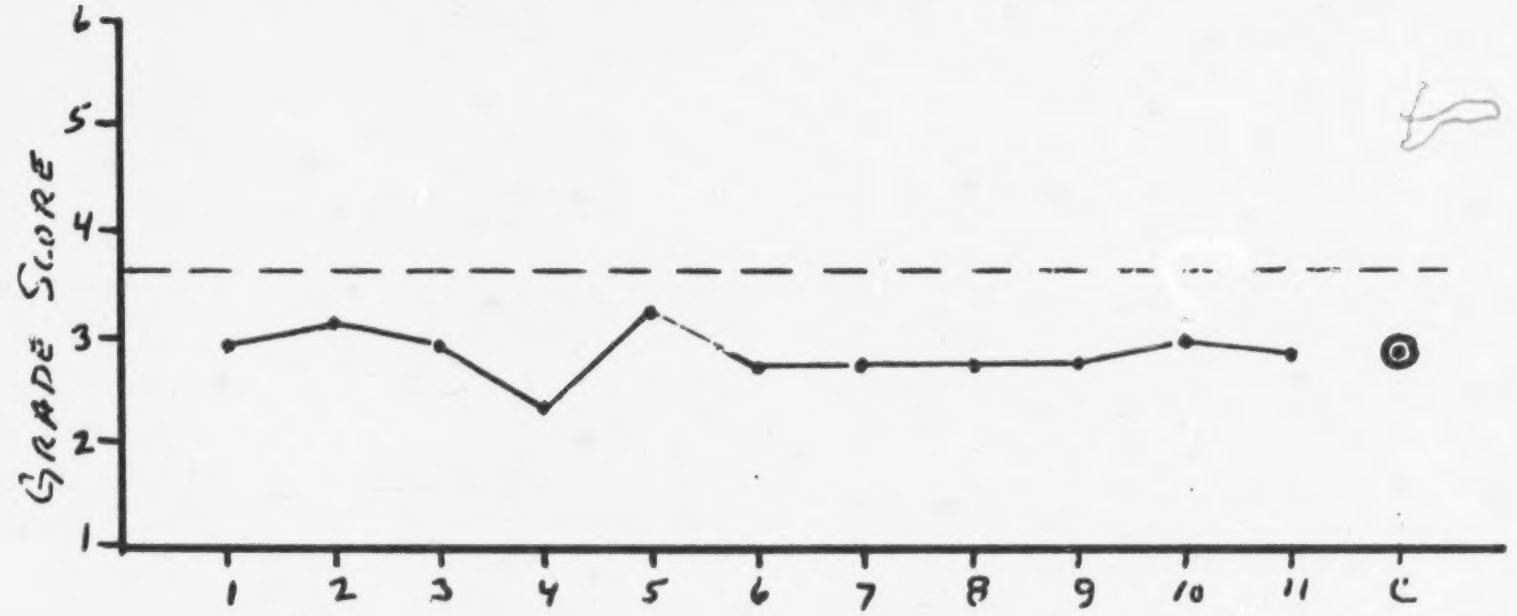
When school started for Student H-18, she would not contribute orally to any classroom discussion. Since she would not read audibly, it was hard to correct her mistakes or even know how well she read. She was very low in mathematics to the extent that she could not add or subtract. We worked to extend her attention span and found that this improved her arithmetic as well as her other subjects. As the year progressed, she became more and more outgoing until she finally had to be reminded not to talk so much during class. She still did not have enough patience to complete long assignments but she did very well on what she did do. She is now a fairly good student although it will take her a while to catch up on what she has previously missed.

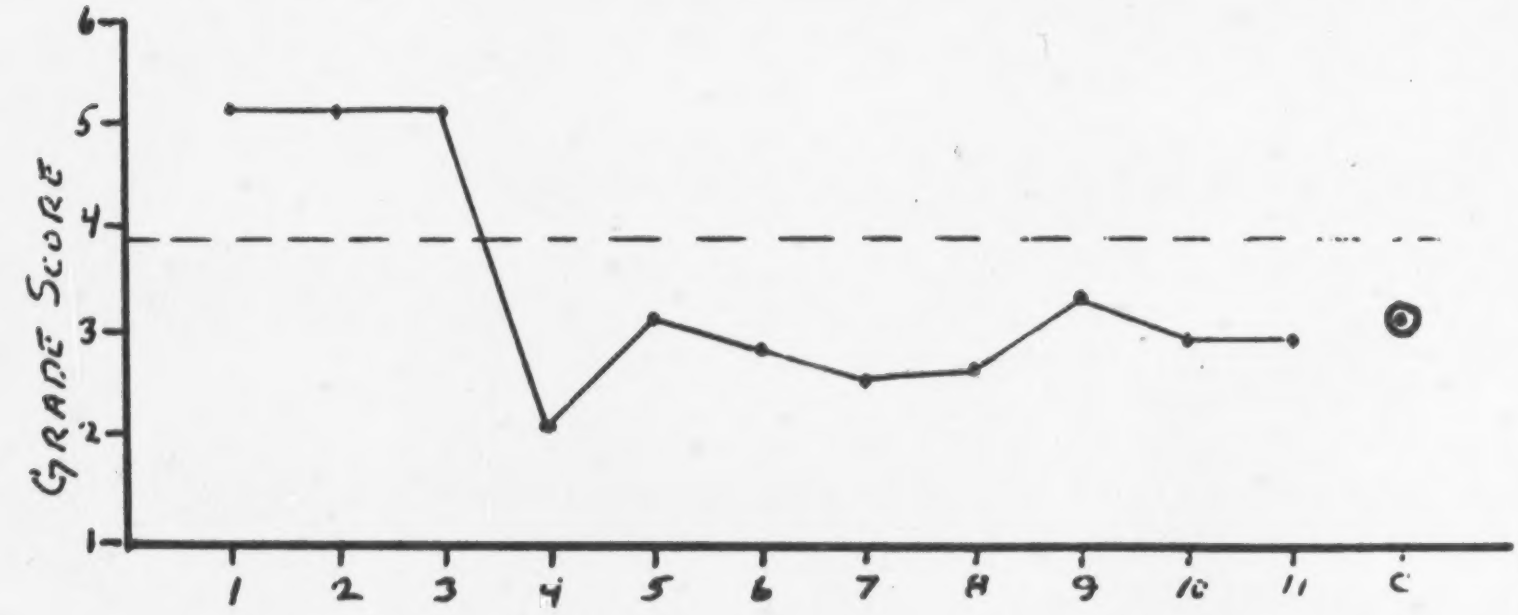
STUDENT H-18
ITPA



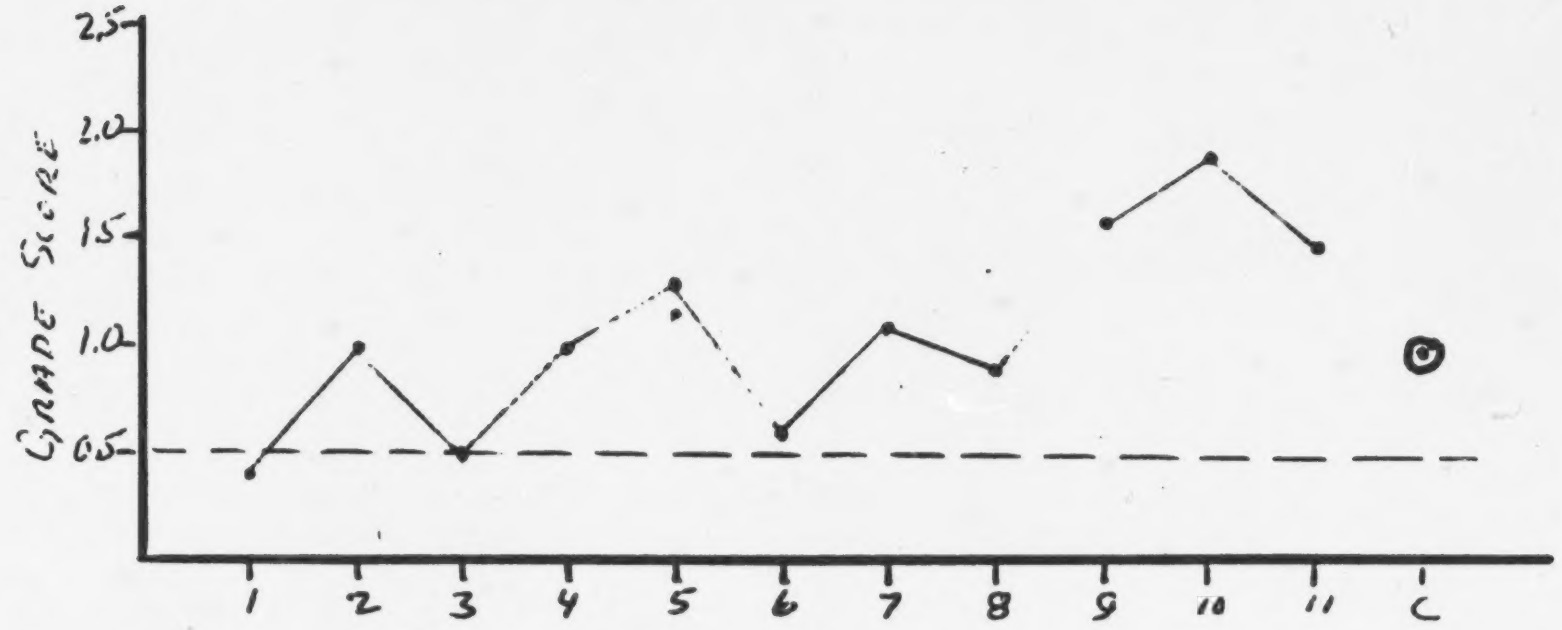
STUDENT H-18
SRA

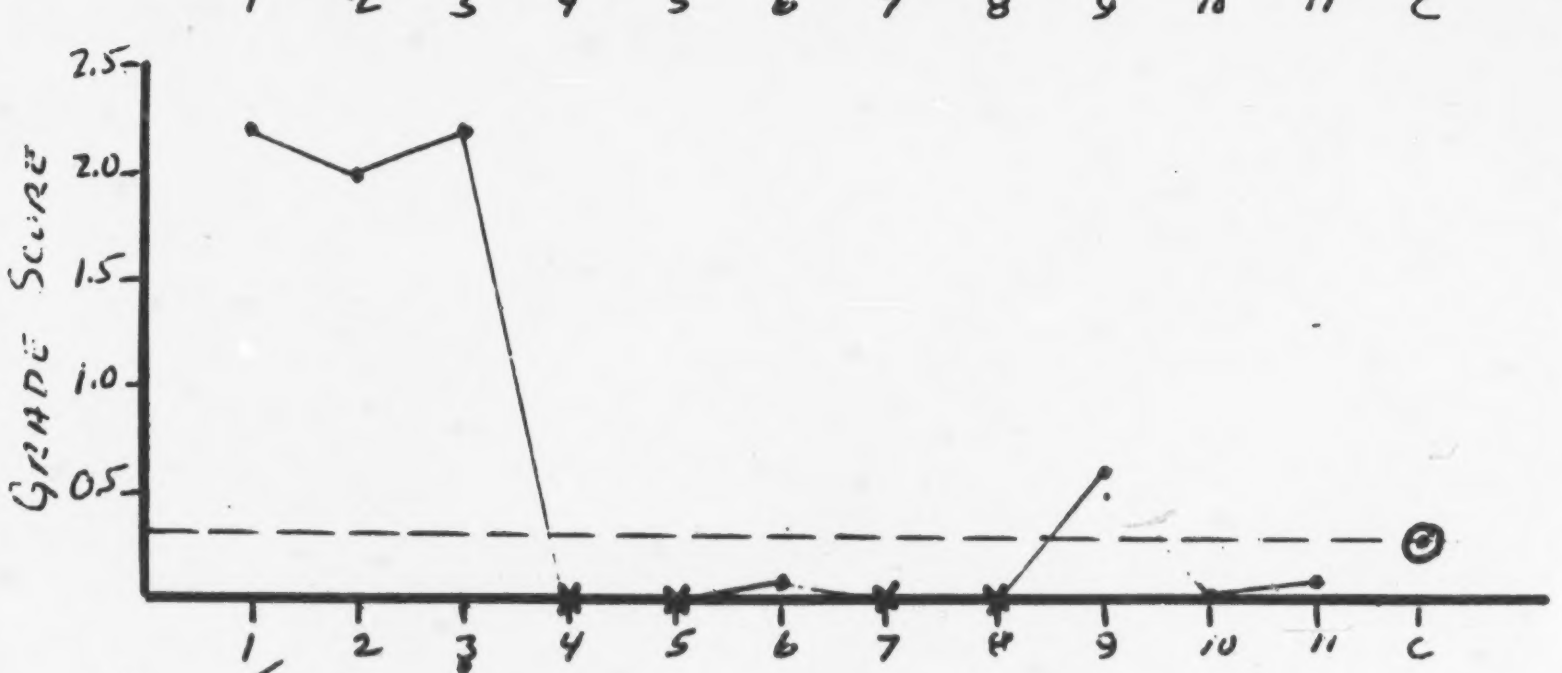


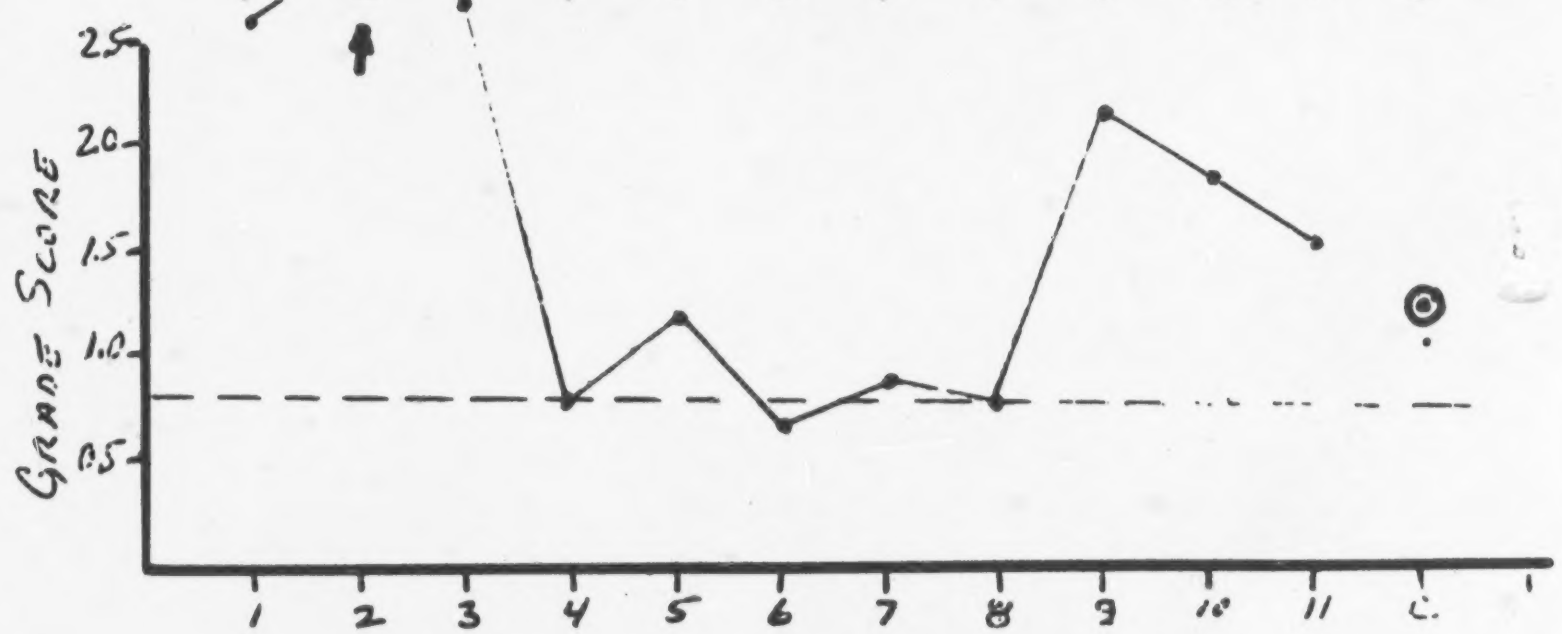




STUDENT H-18
SRA GAINS







STUDENT H-18

TEST	INITIAL SCORE	GAIN	FINAL SCORE	GAIN	% GAIN
1	2.5	1.5	5.1	2.6	173.3
2	2.1	1.1	5.1	3.0	272.7
3	2.4	1.4	5.1	2.7	192.9
4	1.3	0.3	2.1	0.8	266.7
5	1.9	0.9	3.1	1.2	133.3
6	2.1	1.1	2.8	0.7	63.6
7	1.6	0.6	2.5	0.9	150.0
8	1.8	0.8	2.6	0.8	100.0
9	1.1	0.1	3.3	2.2	220.0
10	1	0	2.9	1.9	INF
11	1.3	0.3	2.9	1.6	533.3
C	1.8	0.8	3.1	1.3	162.5

STUDENT H-19

TEST	INITIAL SCORE	GAIN	FINAL SCORE	GAIN	% GAIN
1	4.1	3.1	6+	1.9+	61.3+
2	4.8	3.8	5.1	0.3	7.9
3	4.5	3.5	5.6	1.1	31.4
4	3.2	2.2	4.1	0.9	40.9
5	4.7	3.7	6+	1.3+	35.1+
6	3.3	2.3	5.5	2.2	95.7
7	3.5	2.5	5.4	1.9	76.0
8	4.5	3.5	5.7	2.2	62.9
9	5.1	4.1	6+	0.9+	22.0+
10	4.5	3.5	4.5	0	0
11	4.6	3.6	5.2	0.6	16.7
C	4.3	3.3	5.3	1.0	30.3

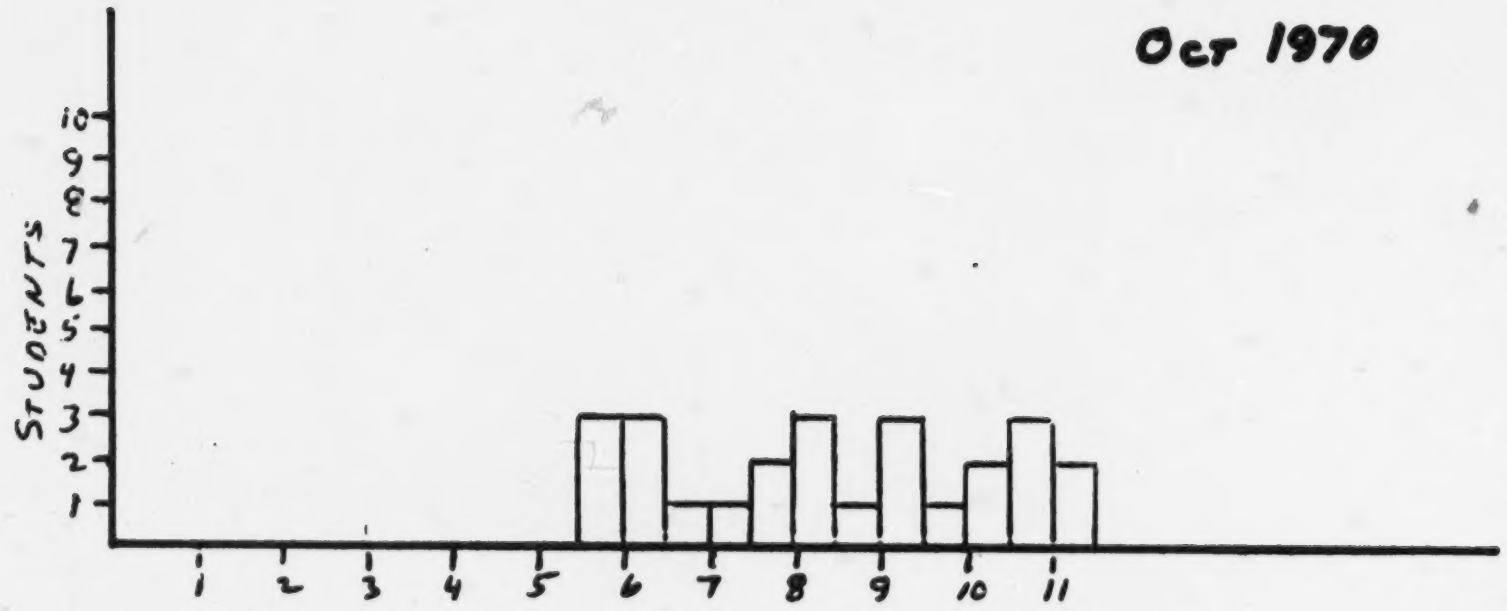
ITPA TEST 4 - VISUAL ASSOCIATION

Class F (Ave. Age)	8-6	9-1
High	11+	11+
Low	6-0	5-0
Mean	8-4	9-10
Median	8-0	9-4
Class H (Ave. Age)	8-8	9-3
High	11+	11+
Low	5-6	7-2
Mean	8-2	9-10
Median	8-0	10-6
Class T (Ave. Age)	8-7	9-2
High	11+	11+
Low	5-6	5-0
Mean	8-3	9-10
Median	8-0	10-3

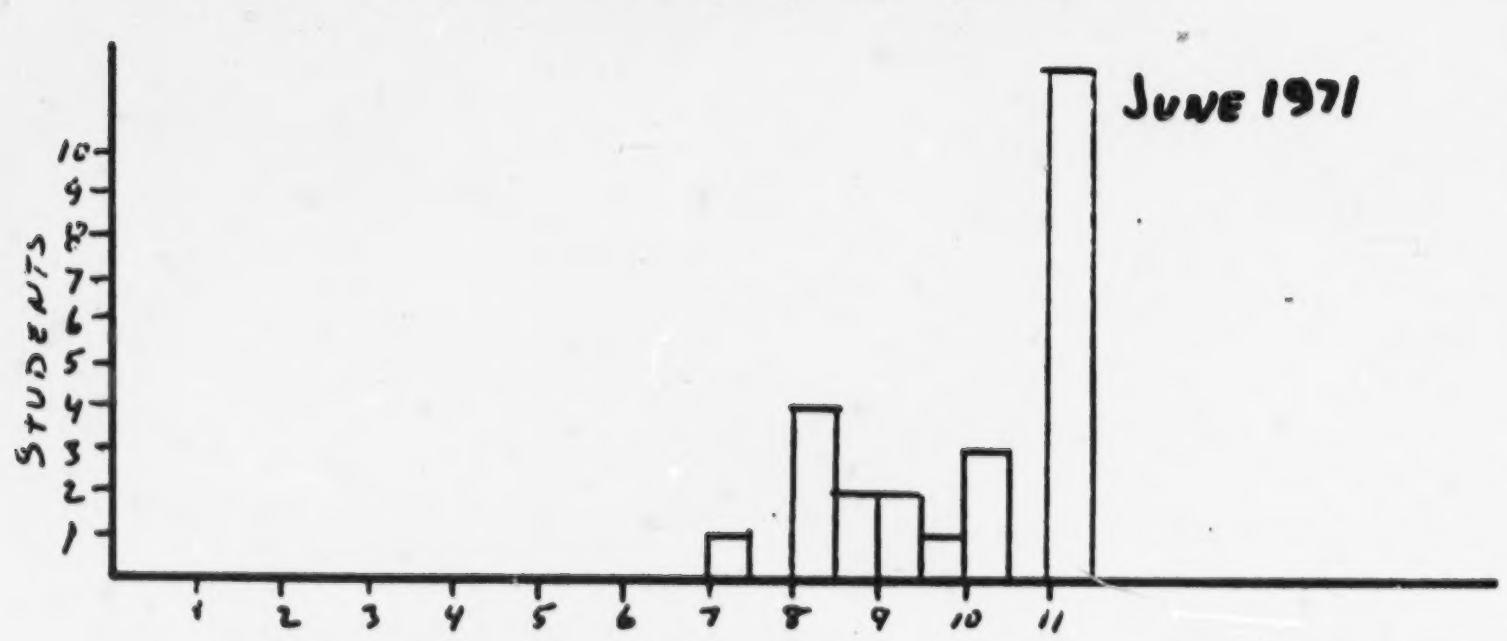
TEST 4

VISUAL ASSOCIATION
CLASS H

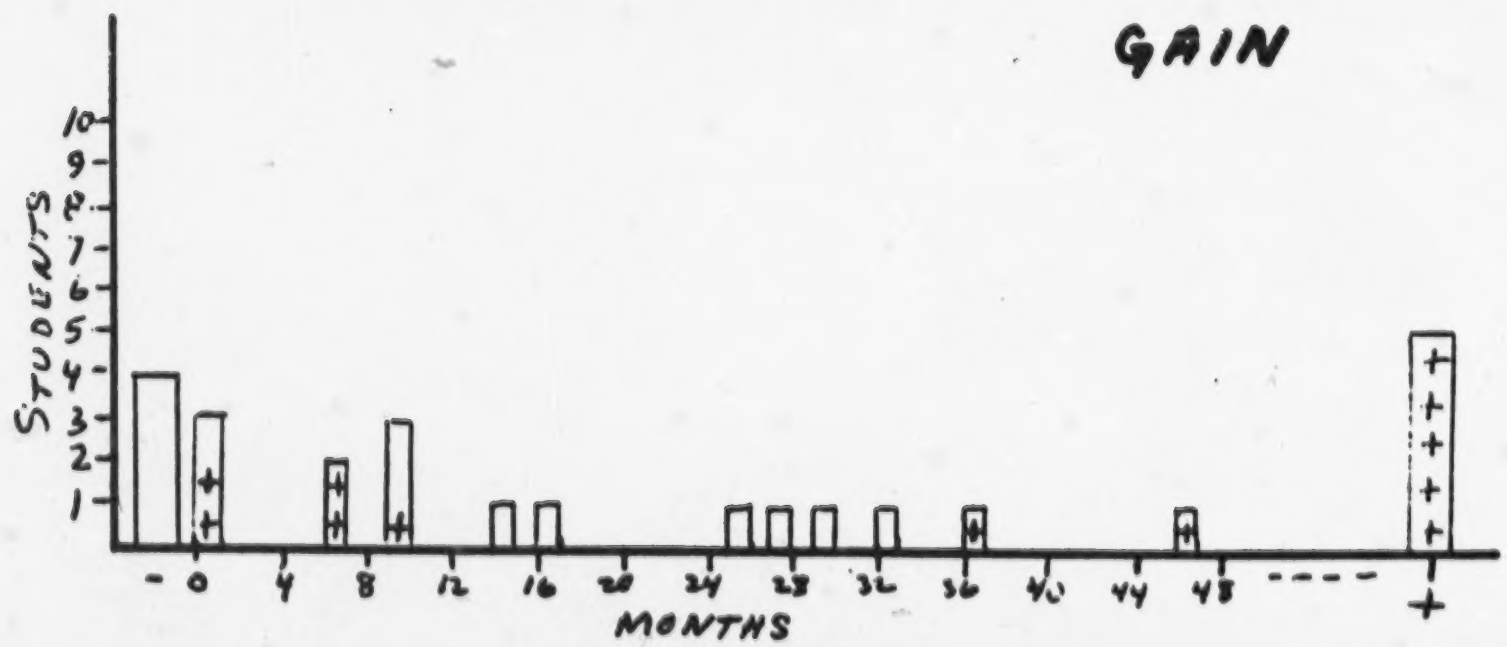
OCT 1970



JUNE 1971



GAIN



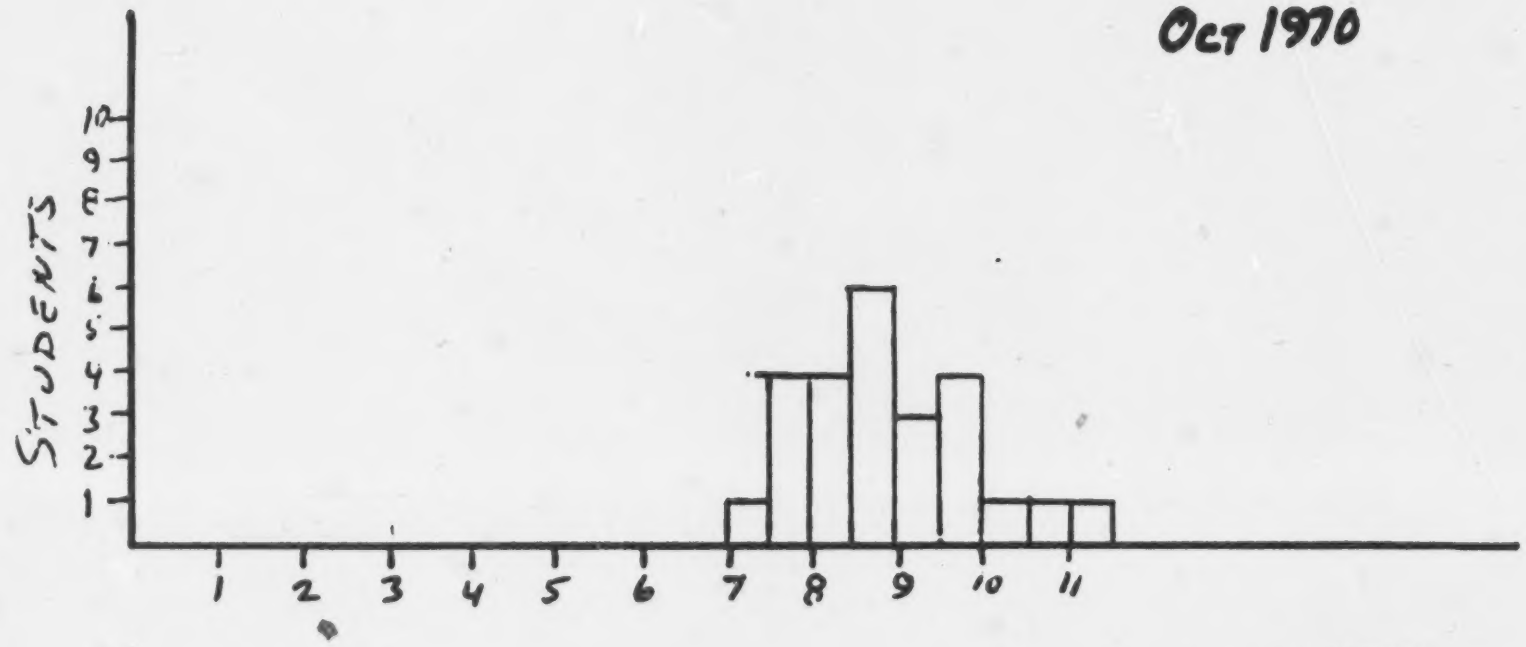
ITPA TEST 11 - COMPOSITE SCORE

Class F (Ave. Age)	8-6	9-1
High	11+	11+
Low	7-0	7-8
Mean	8-6	10-4
Median	8-10	11+
Class H (Ave. Age)	8-8	9-3
High	11+	11+
Low	7-2	7-9
Mean	8-7	9-9
Median	8-9	10-1
Class T (Ave. Age.)	8-7	9-2
High	11+	11+
Low	7-0	7-8
Mean	8-7	10-2
Median	8-9	11+

TEST 11

COMPOSITE ITPA
CLASS H

OCT 1970



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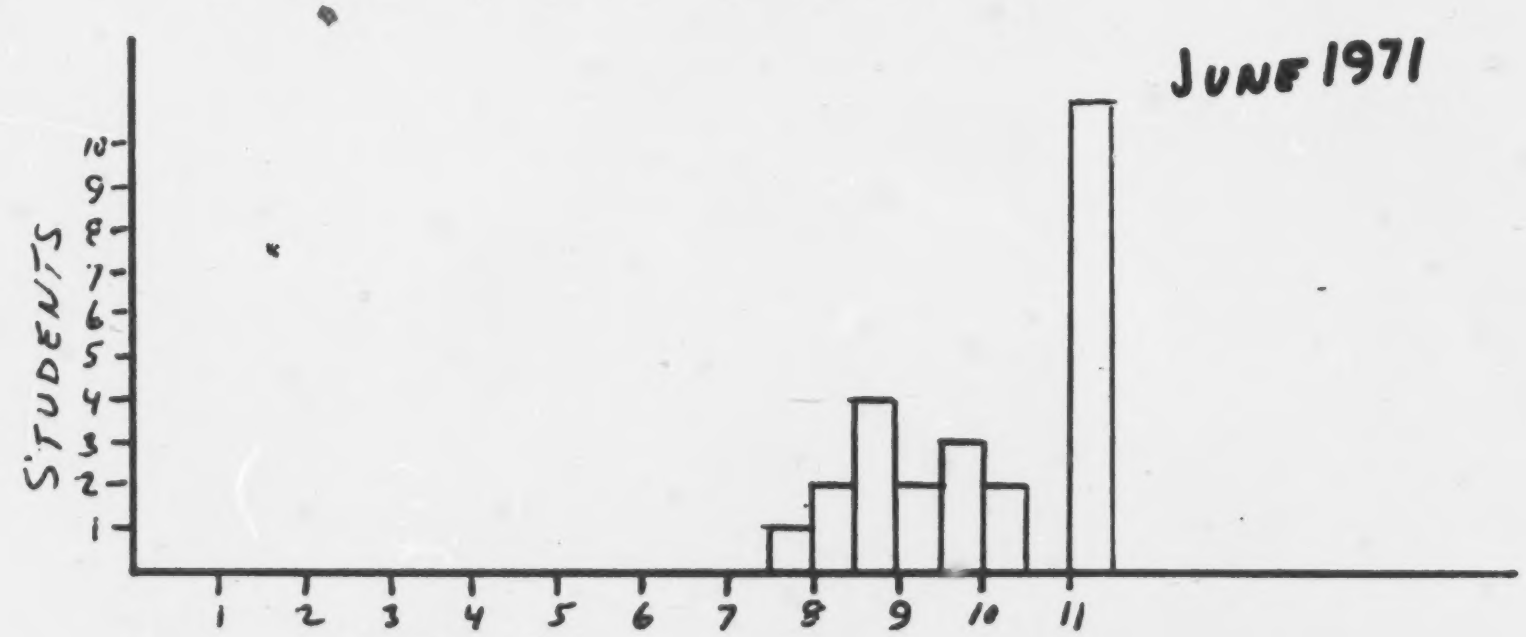
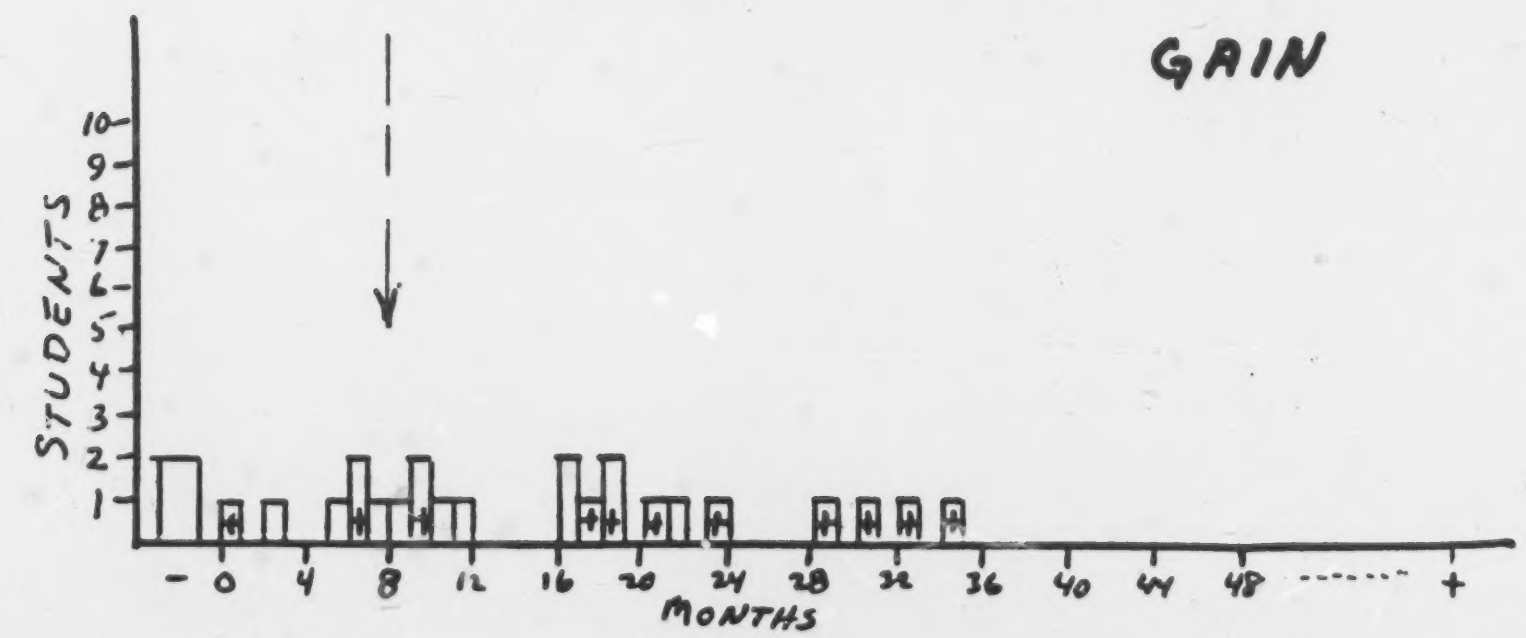


GAIN

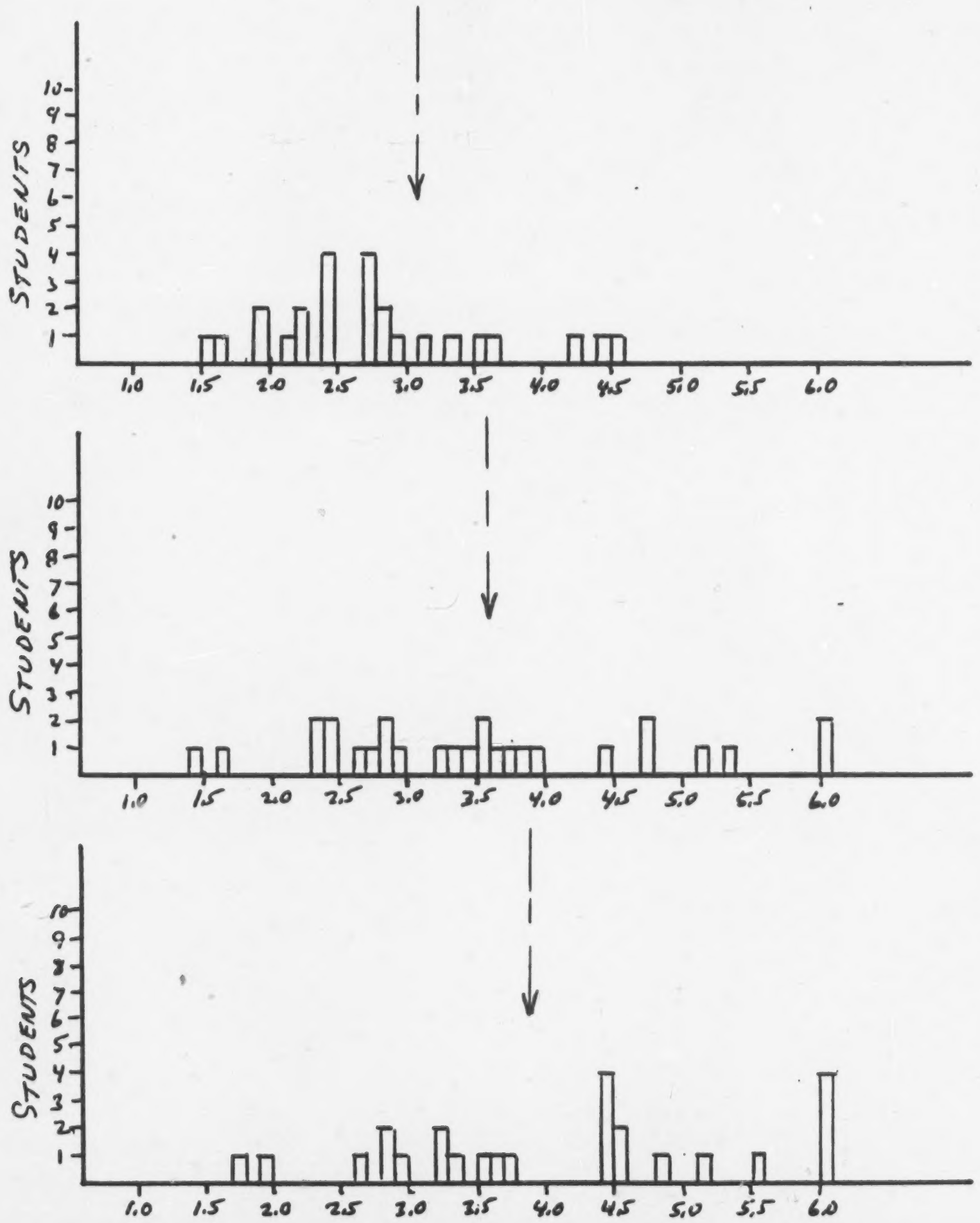


SRA TEST 3 - TOTAL READING

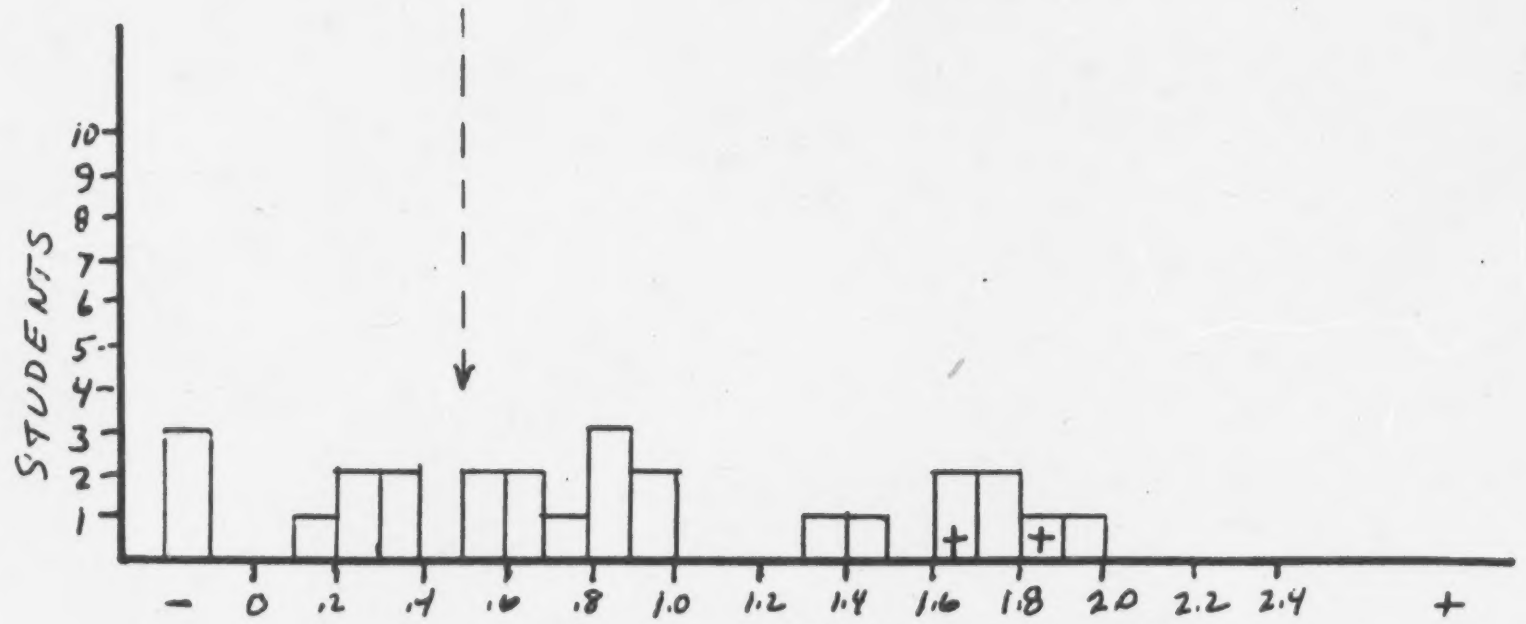
Standard	3.1	3.6	3.9
Class F			
High	4.8		6+
Low	1		2.5
Mean	2.6		3.6
Median	2.55		3.35
No. Above Std.	8		6
No. Below Std.	15		17
Class H			
High	4.5	6+	6+
Low	1.5	1.4	1.7
Mean	2.8	3.5	4.1
Median	2.7	3.4	4.4
No. Above Std.	6	9	13
No. Below Std.	18	15	12
Class T			
High	4.8		6+
Low	1		1.7
Mean	2.7		3.8
Median	2.6		3.6
No. Above Std.	15		19
No. Below Std.	37		29

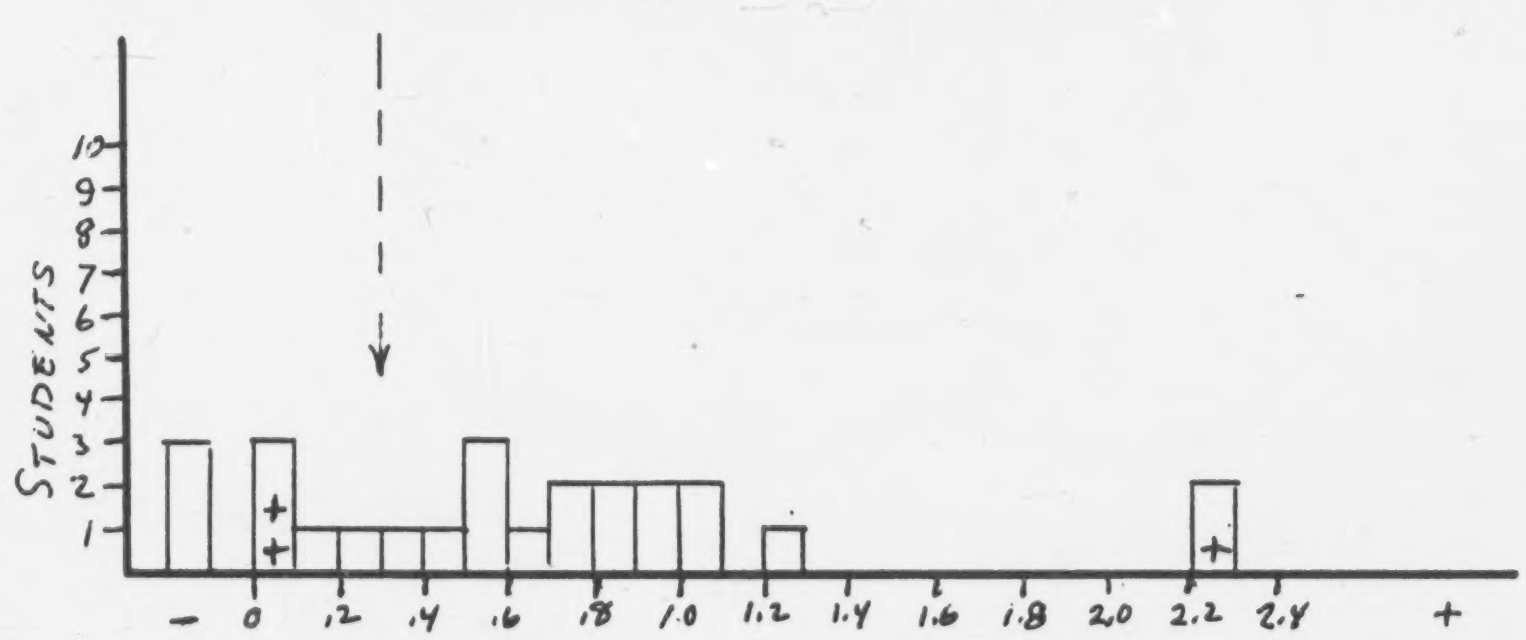
TEST 3

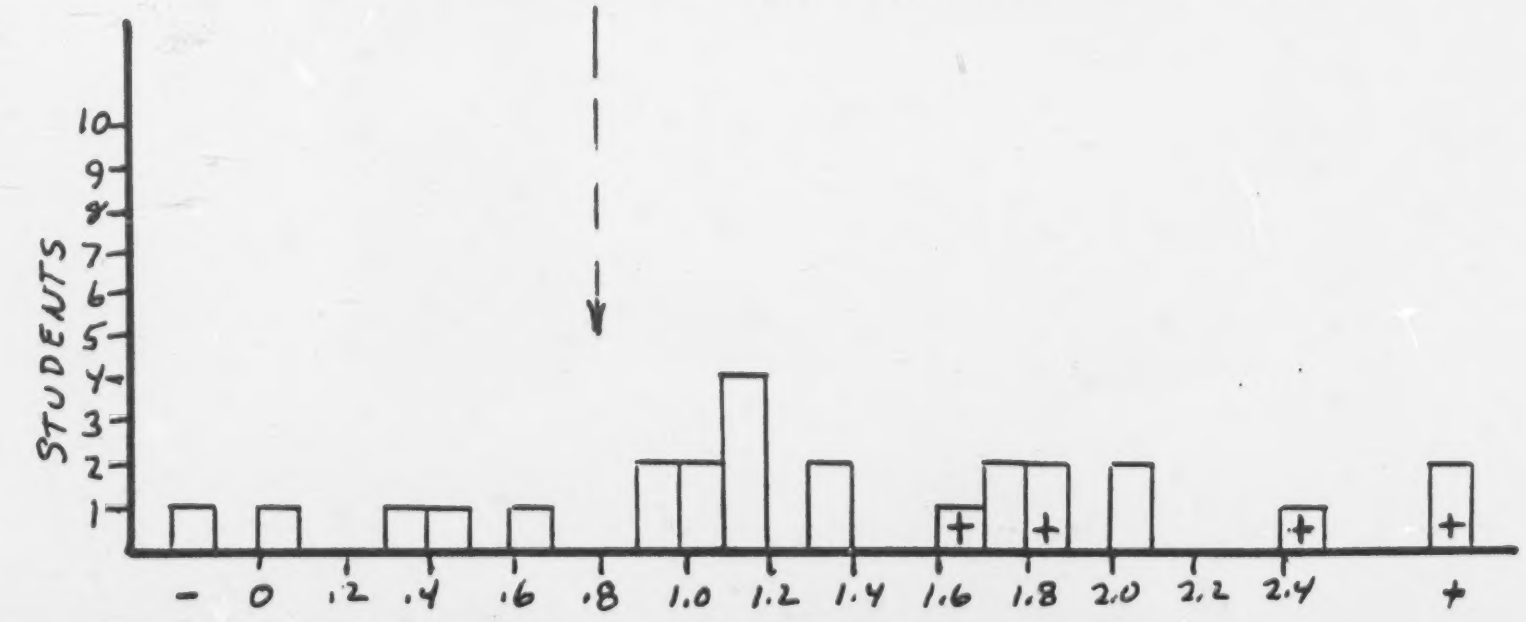
TOTAL READING
CLASS H



TEST 3 GAINS TOTAL READING CLASS H



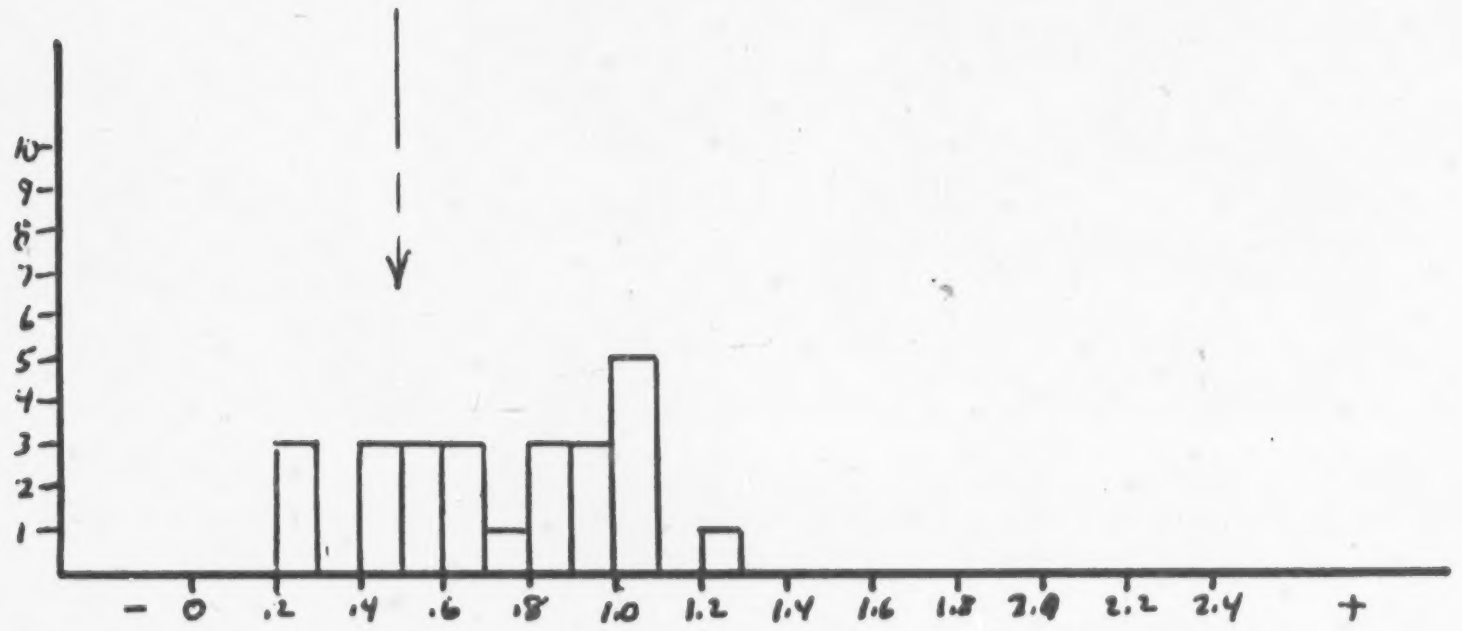


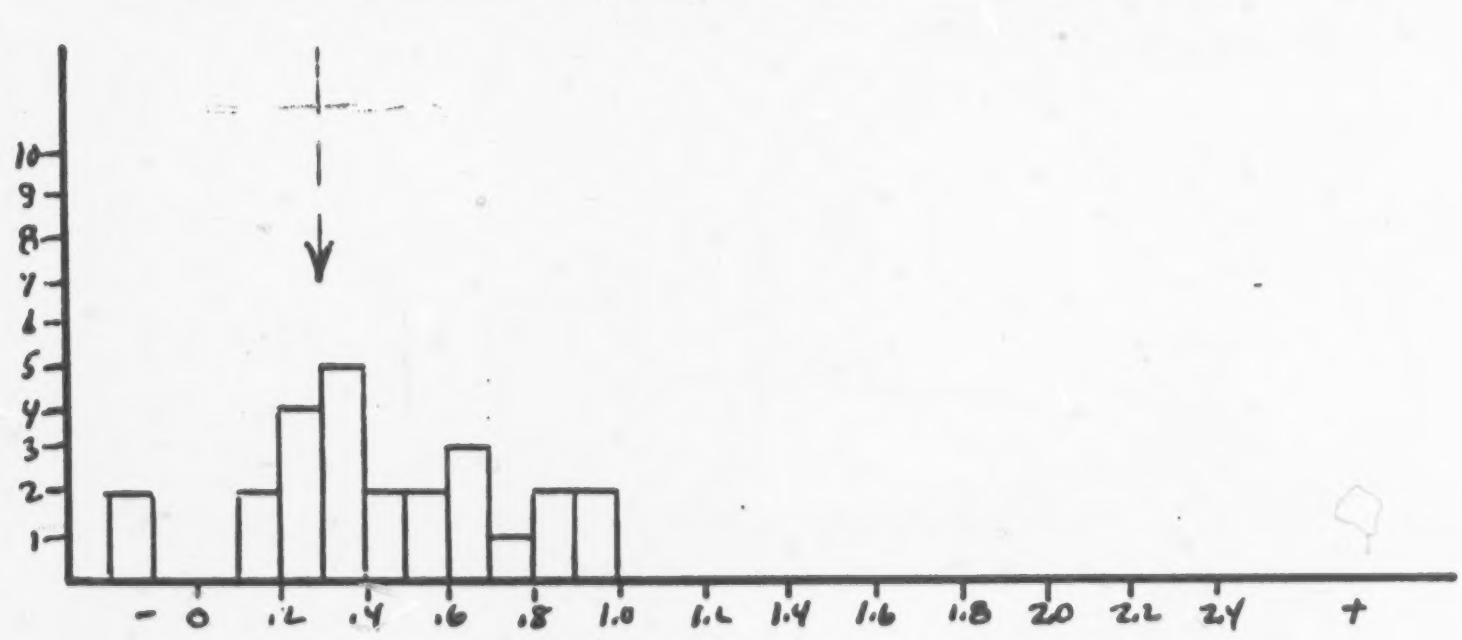


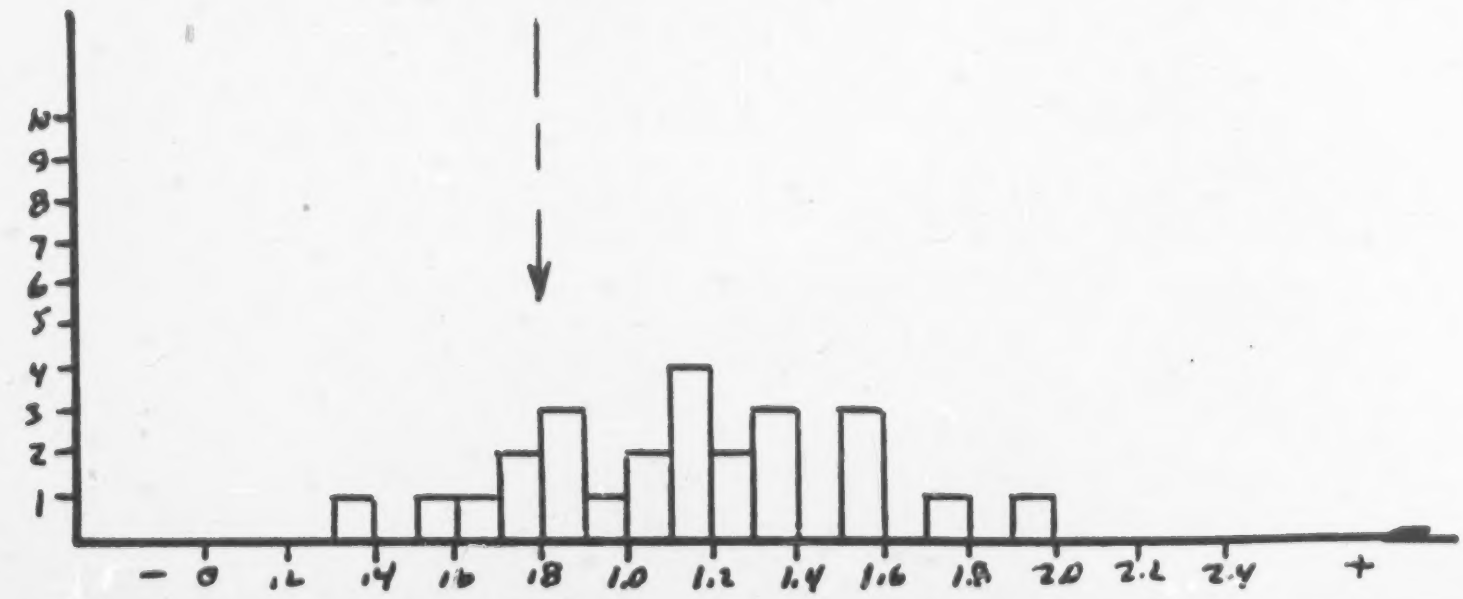
SRA TEST 12 - COMPOSITE RESULTS

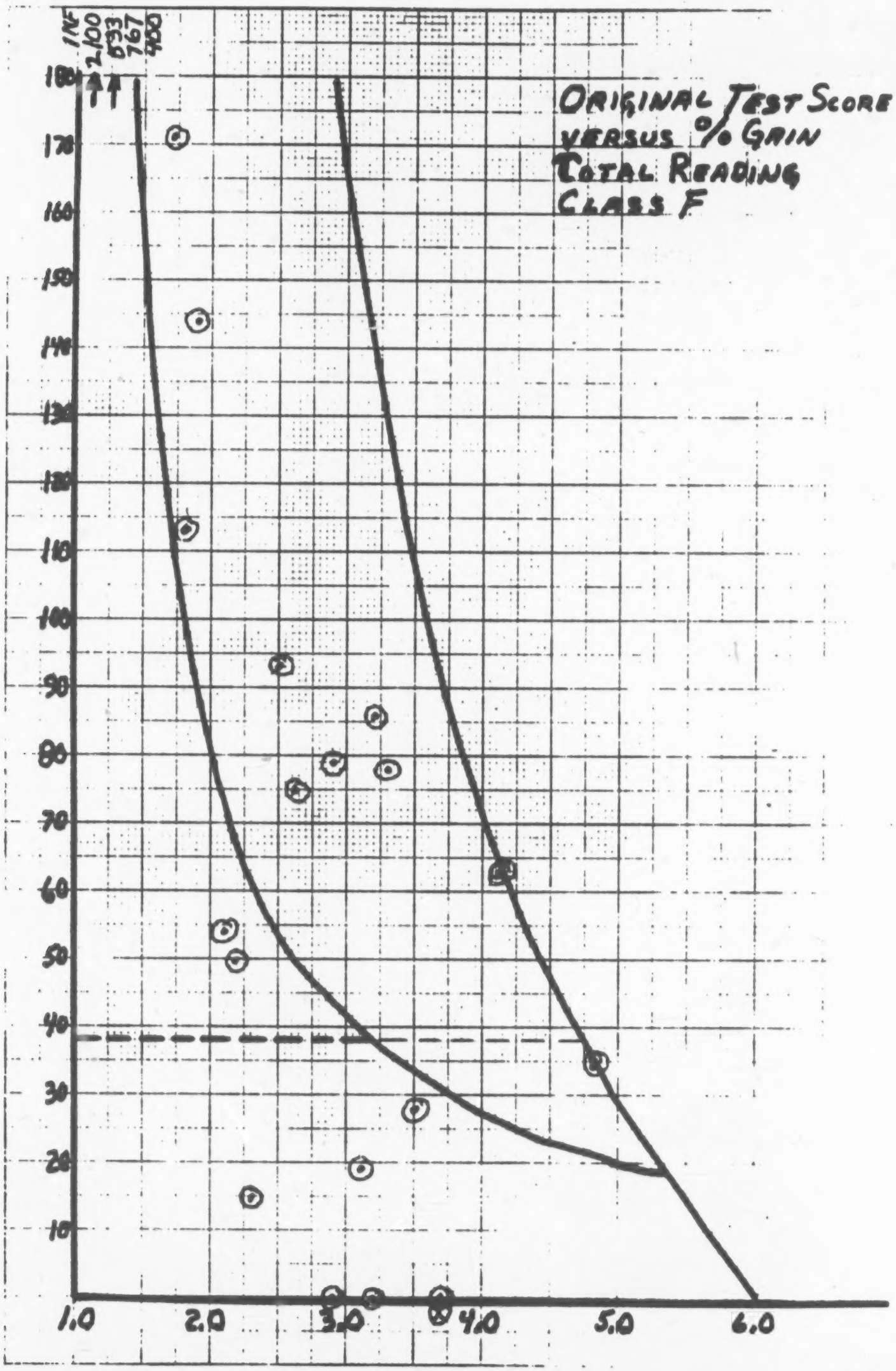
Standard	3.1	3.6	3.9
Class F			
High	4.2		5.4
Low	1.3		2.5
Mean	2.7		3.7
Median	2.5		3.4
No. Above Std.	7		6
No. Below Std.	17		18
Class H			
High	4.3	5.4	5.7
Low	1.8	2.3	2.6
Mean	2.9	3.6	3.9
Median	2.7	3.55	3.9
No. Above Std.	9	11	12
No. Below Std.	15	13	12
Class T			
High	4.3		5.7
Low	1.3		2.5
Mean	2.8		3.8
Median	2.6		3.6
No. Above Std.	16		18
No. Below Std.	32		30

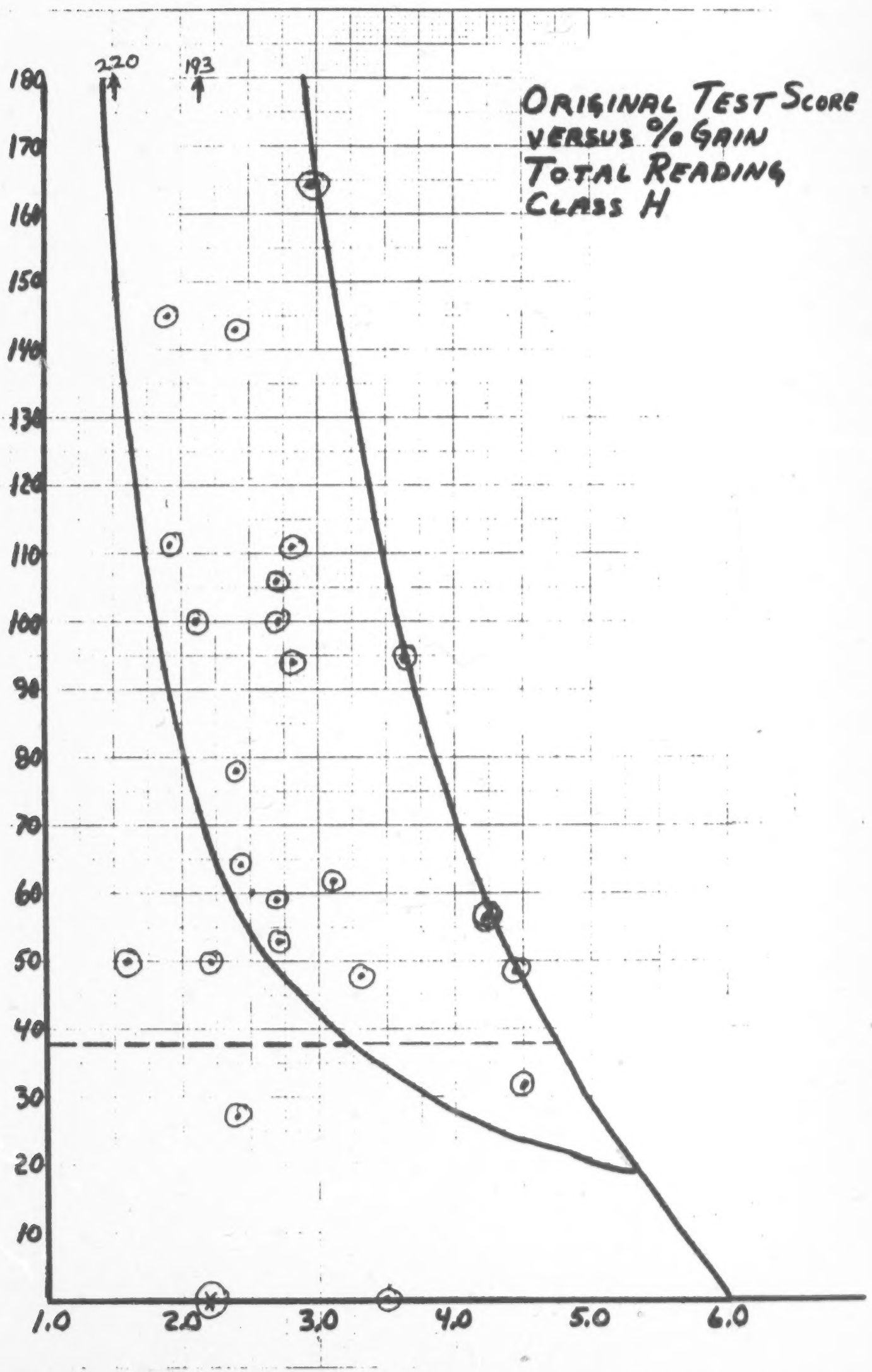
TEST 12 GAINS SRA COMPOSITE RESULTS CLASS H

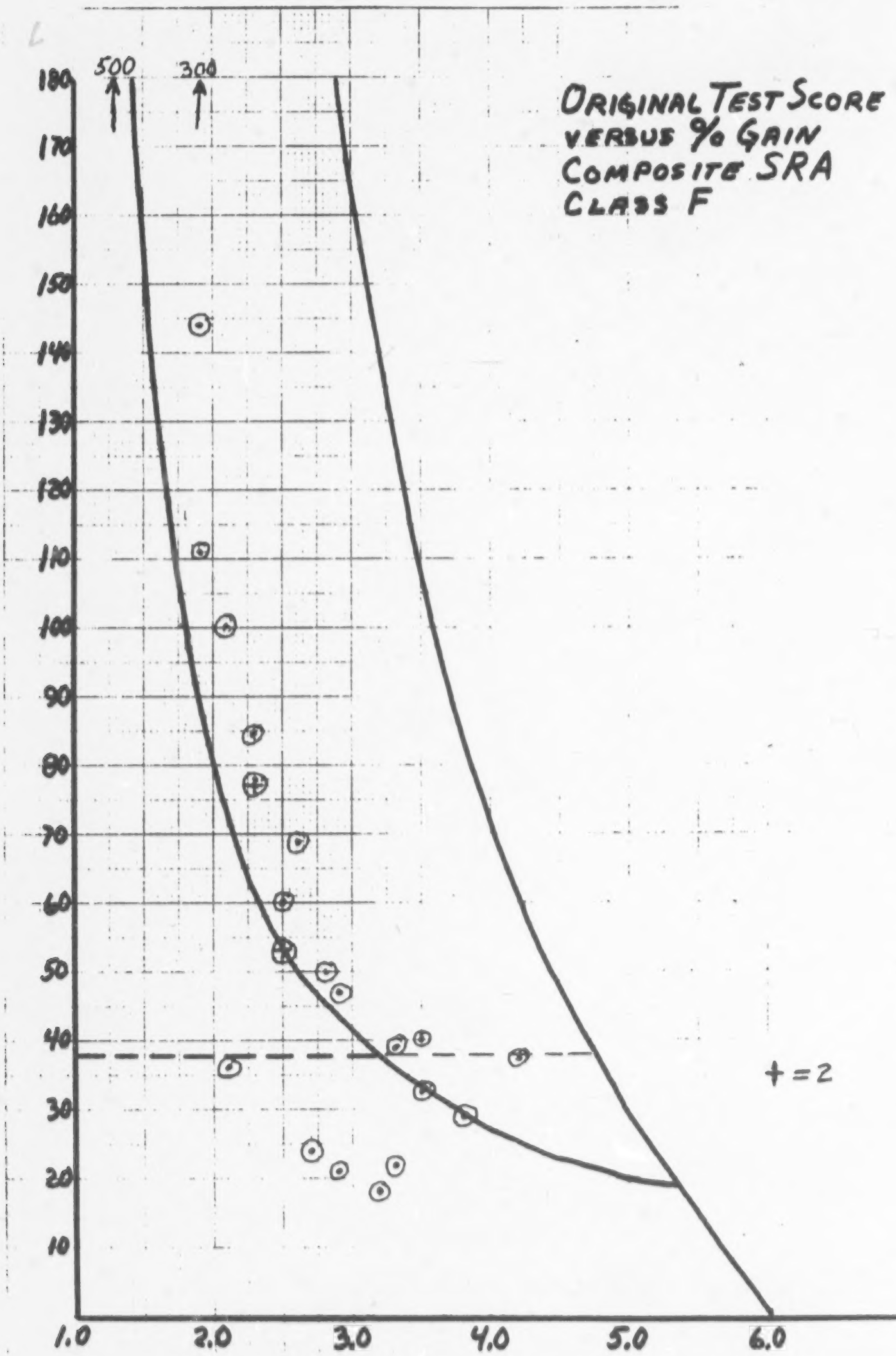


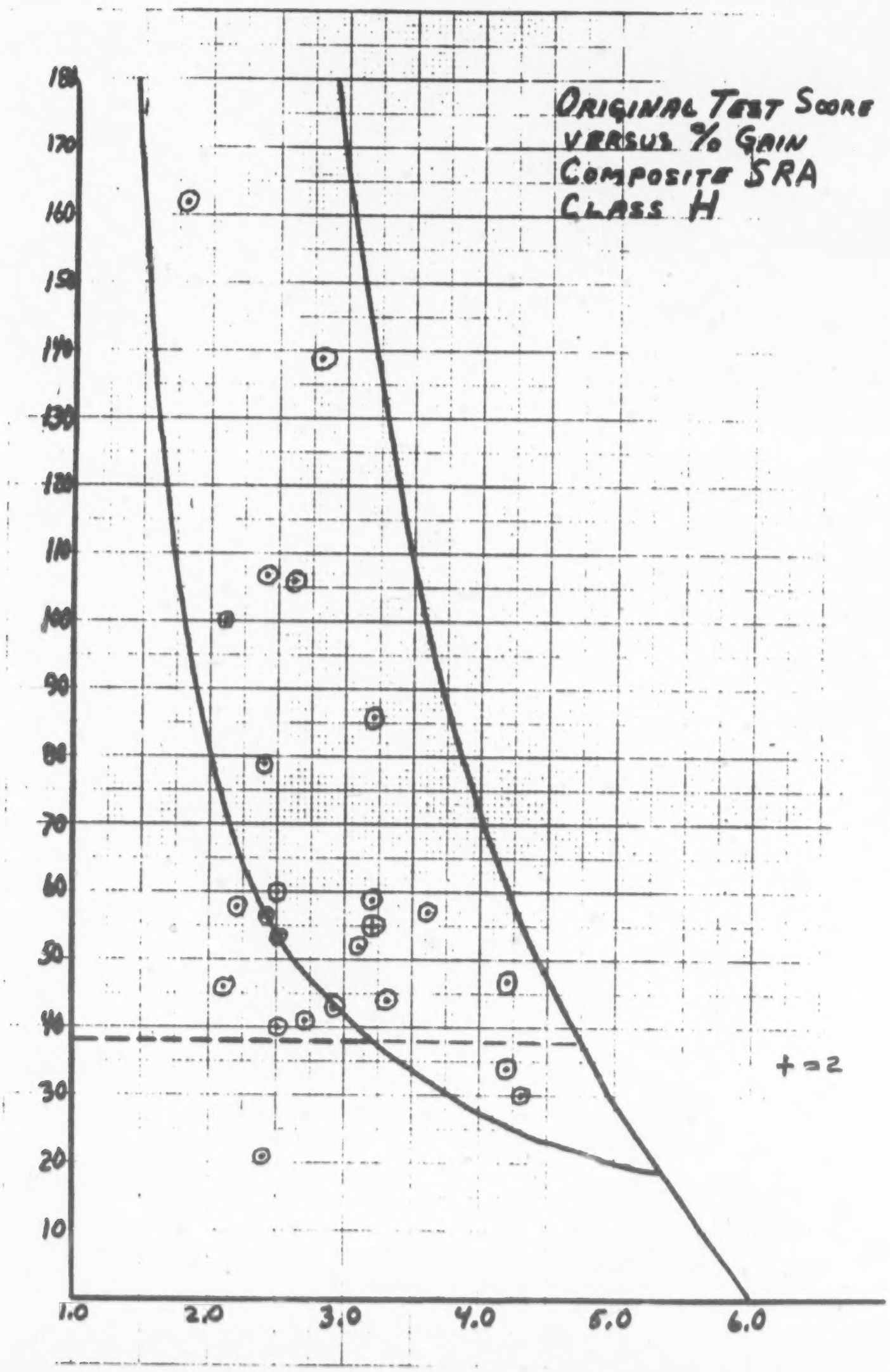





INF
2,100
633
767
400
ORIGINAL TEST SCORE
VERSUS % GAIN
TOTAL READING
CLASS F
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
1.0
2.0
3.0
4.0
5.0
6.0


220
193
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
1.0
2.0
3.0
4.0
5.0
6.0
ORIGINAL TEST SCORE
VERSUS % GAIN
TOTAL READING
CLASS H


ORIGINAL TEST SCORE
VERSUS % GAIN
COMPOSITE SRA
CLASS F
500
300
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
1.0
2.0
3.0
4.0
5.0
6.0
+ = 2


ORIGINAL TEST SCORE
VERSUS % GAIN
COMPOSITE SRA
CLASS H
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
1.0
2.0
3.0
4.0
5.0
6.0
+ = 2